ELEMENT SUSTAINABILITY

KNOTT MILL

ENVIRONMENTAL STANDARDS STATEMENT

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Appendix A - Energy and Carbon Statement

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1. INTRODUCTION

Element Sustainability has been commissioned by Meadway Developments Ltd to review the sustainability and energy performance of the proposed residential development in Manchester.

The purpose of this statement is to summarise the relevant policy background and requirements of Manchester City Council and to demonstrate the ways in which the developer has addressed these aims through their proposals, ensuring all practicable measures have been taken to deliver a sustainable development at this site.

Details of the design attributes, specifications and characteristics of the scheme are appraised in order to demonstrate how the proposals contribute to sustainable development in Manchester and seek to mitigate the environmental impacts of the scheme, providing a sustainability appraisal in support of the planning application.

This report is intended to support the planning application for this development and therefore, establish an approach to the delivery of this scheme which meet the criteria outlined by the council that the developer commits to implement at the site.

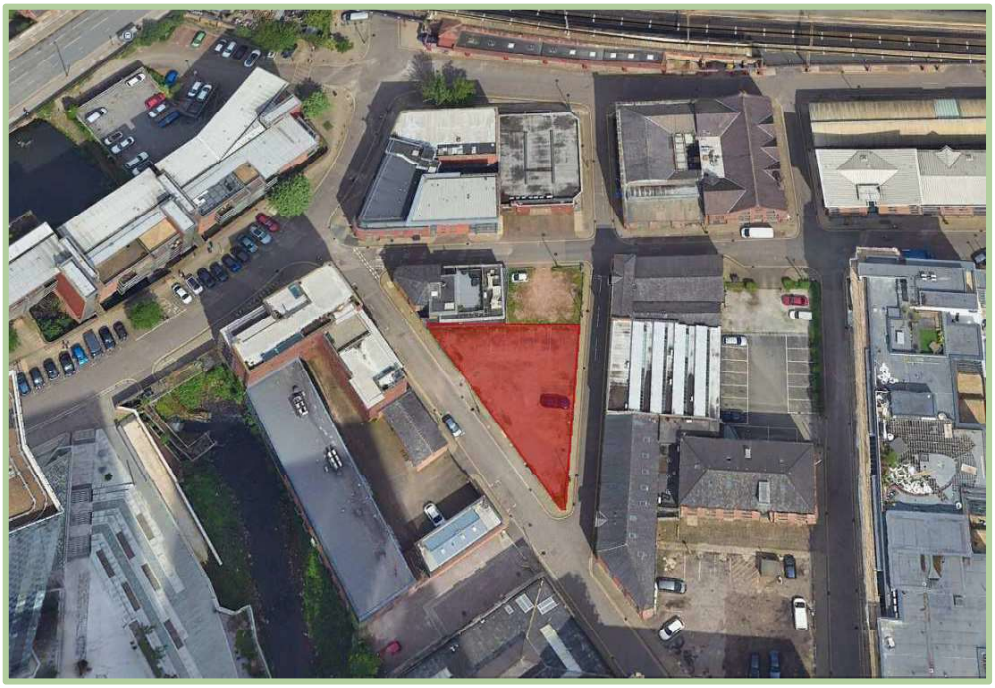
2. DEVELOPMENT PROPOSALS

2.1 Development Site Description

The site is situated at the junction between Commercial Street and Constance Street in Castlefield, Manchester. Currently, the site comprises of a hardstanding car park. Limited features are present on site however towards the borders some vegetation in the forms of weeds and poorly established grasses can be noted. Low rise wooden fencing is present along the western, eastern and northeastern borders. The northwestern border is occupied by a two-storey building that extends to the north off the development footprint.

The area surrounding the site is occupied by a mix of commercial and residential buildings.

Figure 2.1 – Site Location Plan



2.2 Development Proposals

The Proposed Development includes the development of eight five-storey town houses with private balcony spaces on the roof of each dwelling. A private garage will also be situated on the ground floor of each town house.

Figure 2.2 to 2.8 present the proposed elevations and floor plans for the proposed development:

Figure 2.2 – Proposed Ground Floor Layout

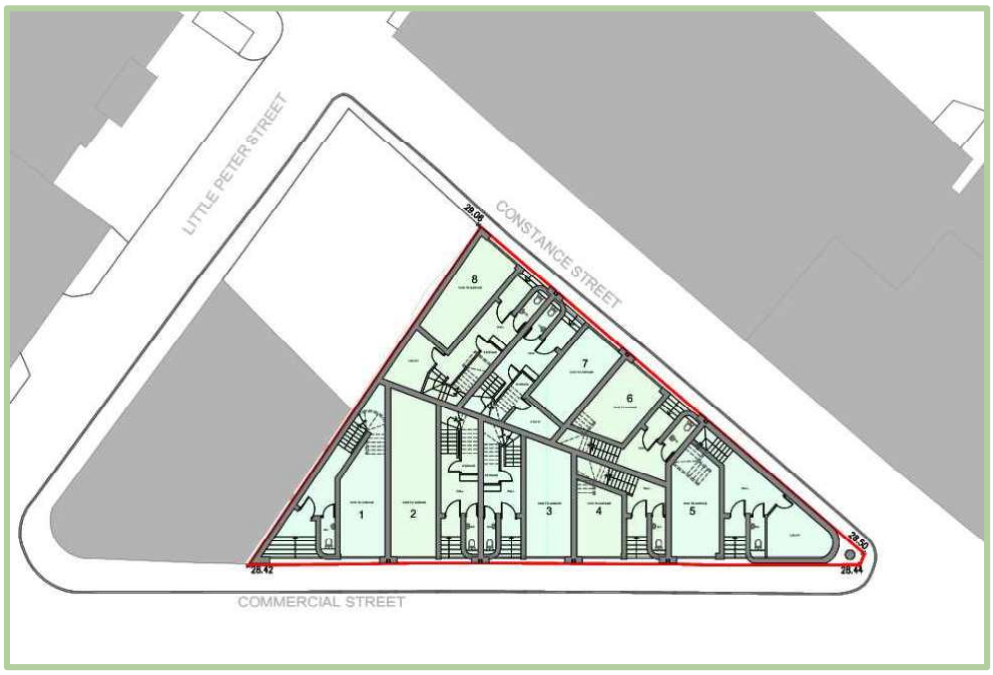


Figure 2.3 – Proposed First Floor and Second Floor Layout

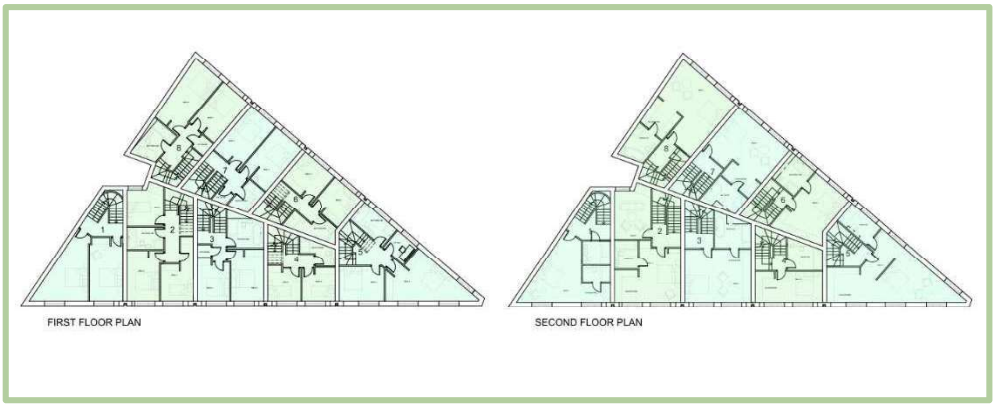


Figure 2.4 – Proposed Third and Fourth Floor Layout

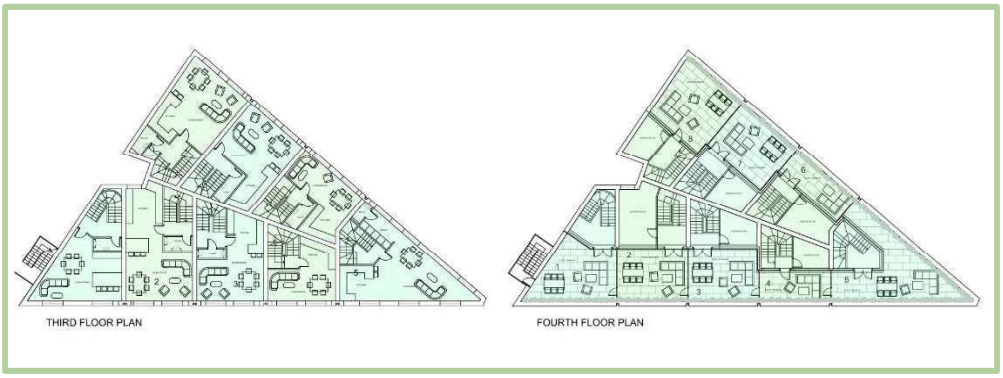


Figure 2.5 – Proposed Roof Plan

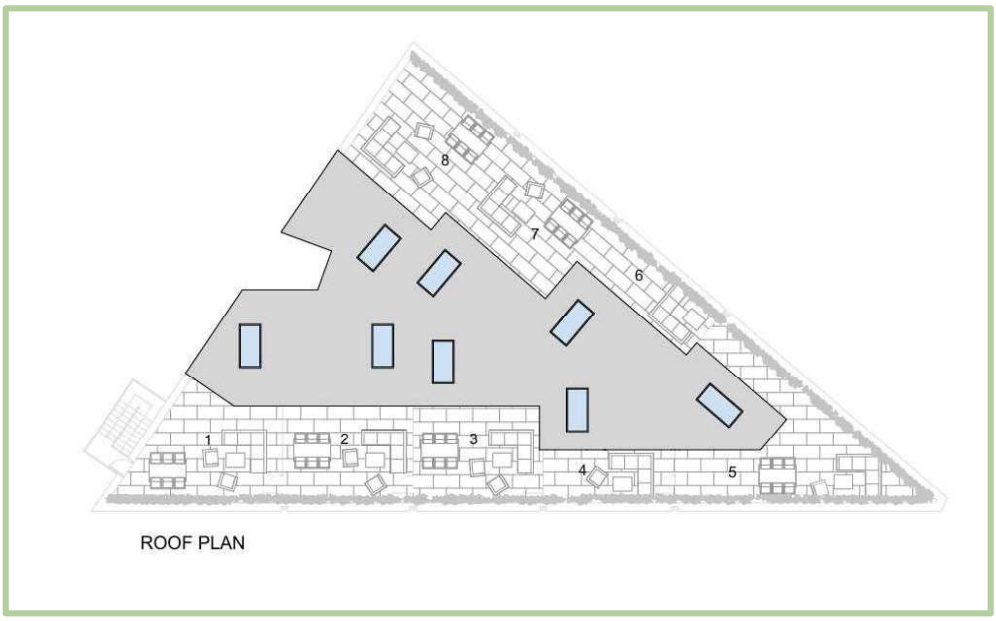


Figure 2.6 – Proposed Eastern Elevation



Figure 2.7 – Proposed Western Elevation



Figure 2.8 – Proposed Site Plan



3. POLICY REVIEW

3.1 National Planning Policy

The National Planning Policy Framework was revised on 12th December 2024 and sets out the government's planning policies for England and how these are expected to be applied.

The purpose of the planning system is to contribute to the achievement of sustainable development. The planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways, as set out below:

An economic objective – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;

A social objective – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations, and by fostering well-designed, beautiful and safe places, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and

An environmental objective – to protect and enhance our natural, built and historic environment, including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

These objectives should be delivered through the preparation and implementation of plans and the application of the policies in this framework. Planning policies and decisions should play an active role in guiding development towards sustainable solutions, but in doing so should take local circumstances into account, to reflect the character, needs and opportunities of each area.

3.2 Local Planning Policy

3.2.1 Manchester Core Strategy

Manchester's Core Strategy was adopted on the 11th July 2012 and remains the key document in the adopted Manchester Local Plan. It sets the out the long-term strategic policies for Manchester's future development and will form the framework that planning applications will be assessed against.

Policy EN 4 - Reducing CO_2 Emissions by Enabling Low and Zero Carbon Development: The council will seek to reduce fuel poverty and decouple growth in the economy, growth in CO_2 emissions, and rising fossil fuel prices, through the following actions:

Where possible new development and retrofit projects will be used as a mechanism to help improve energy efficiency and provide low and zero carbon energy supplies to existing buildings.

Where appropriate new development and retrofit projects will be required to connect to and / or make contributions to low or zero carbon energy schemes and / or to incorporate provision to enable future connection to any existing / potential decentralised energy schemes.

The use of building materials with low embodied carbon in new development and refurbishment schemes

Policy EN 5 - Strategic Areas for Low and Zero Carbon Decentralised Energy Infrastructure: Within Manchester it is considered that the following strategic areas, will have a major role to play in achieving an increase in the level of decentralised, low and zero carbon energy supplies available:

- The Regional Centre, which also includes the Oxford Road Corridor and Eastlands;
- District Centres and associated major development sites;
- Airport Strategic site;
- Strategic housing location; and,
- Strategic employment locations.

Within these areas new development, regeneration and retrofit projects will be expected to take place in the context of more detailed proposals for decentralised low and zero carbon energy infrastructure in the form of energy proposals plans.

Policy EN 8 – Adaption to Climate Change requires all new development to be adaptable to climate change in terms of the design, layout, siting and function of both buildings and associated external spaces. In achieving developments which are adaptable to climate change developers should have regard to the following, although this is not an exhaustive list:

- Reduction in urban heat island effect using green infrastructure such as green roofs, green walls, increased tree cover and waterways; and,
- The need to control overheating of buildings through passive design; and

Developers will be permitted to use green infrastructure elements such as green roofs, green walls, street trees and waterways to contribute to compliance with CO_2 mitigation under Policy EN6, subject to sufficient evidence to quantify their contribution to compliance.

Policy EN9 - Green Infrastructure: New development will be expected to maintain existing green infrastructure in terms of its quantity, quality and multiple function. Where the opportunity arises, and in accordance with current green infrastructure strategies, the council will encourage developers to enhance the quality and quantity of green infrastructure, improve the performance of its functions and create and improve linkages to and between areas of green infrastructure. Where the benefits of a proposed development are considered to outweigh the loss of an existing element of green infrastructure, the developer will be required to demonstrate how this loss will be mitigated in terms of quantity, quality, function and future management.

Policy EN14 – Flood Risk: The council requires developments to:

- Be directed away from sites at the greatest risk of flooding, and towards sites with little or no risk of flooding; this should take account of all sources of flooding identified in the Manchester-Salford-Trafford Strategic Flood Risk Assessment (SFRA).

Policy EN15 – Biodiversity and Geological Conservation: The council will seek to maintain or enhance sites of biodiversity and geological value throughout the city.

Developers will be expected to identify and implement reasonable opportunities to enhance, restore or create new biodiversity, either on-site or adjacent to the site, contributing to linkages between valuable or potentially valuable habitat areas where appropriate, with reference to:

- The Manchester Biodiversity Strategy, which provides further details of priority habitats within Manchester and opportunities for biodiversity enhancement including corridors such as the Mersey, Medlock and Irk River valleys, the canals and disused railway lines, and areas of managed greenspace particularly in parks;

- The Green Infrastructure Framework for Greater Manchester, which encompasses an ecological framework that seeks to guide and inform habitat creation and repair, including identifying large 'biodiversity opportunity areas' including the Moston Brook Corridor and Nutsford Vale;

    - Manchester's Climate Change Action Plan;
    - The Strategic Flood Risk Assessment (SFRA) for Manchester;
    - The River Basin Management Plan for the North West; and,
    - The Manchester Tree Strategy.

Any adverse impacts on biodiversity will need to be justified against the wider benefits of the proposal, assessed against other Local Development Framework policies. Where adverse impacts are unavoidable, developers will be required to provide appropriate mitigation and / or compensation. Development should, wherever possible, seek to maintain, enhance or restore existing geology.

Policy EN16 – Air Quality: The council will seek to improve the air quality within Manchester, and particularly within Air Quality Management Areas. Developers will be expected to take measures to minimise and mitigate the local impact of emissions from traffic generated by the development, as well as emissions created by the use of the development itself.

Policy EN17 – Water Quality: The council require:

- New developments to avoid any adverse impact on water quality, including during the construction phase, and wherever possible should seek to enhance water quality, both chemical and ecological.

Policy EN19 – Waste: The council will:

- Require all developers, including those of new waste management facilities within the district, to demonstrate the proposal's consistency with the principles of the waste hierarchy (prevention, reduction, re-use, recycling/composting, energy recovery, final disposal);

- Require all developers to submit a waste management plan to demonstrate how both construction and demolition waste will be minimised, and recycled on site wherever possible, and how the sustainable waste management needs of the end user will be met; and,

- Encourage communities to take responsibility for the waste they create through the provision of accessible facilities.

Policy DM1 – Development Management: All development should have regard to the following specific issues, for which more detailed guidance may be given within a supplementary planning document:

- Accessibility: buildings and neighbourhoods fully accessible to disabled people, access to new development by sustainable transport modes;
- Community safety and crime prevention;
- Design for health;

- Adequacy of internal accommodation and external amenity space;
- Refuse storage and collection;
- Effects relating to biodiversity, landscape, archaeological or built heritage;
- Green infrastructure including open space, both public and private;
- The use of alternatives to peat-based products in landscaping/gardens within development schemes;
- Flood risk and drainage and,
- Subject to scheme viability, developers will be required to demonstrate that new development incorporates sustainable construction techniques (In terms of energy targets this policy should be read alongside policy EN6 and the higher target will apply).

Policy T1 – Sustainable Transport: To deliver a sustainable, high quality, integrated transport system to encourage modal shift away from car travel to public transport, cycling and walking, to support the needs of residents and businesses and to prepare for carbon free modes of transport, the council will support proposals that:

- Improve choice by developing alternatives to the car;
- Facilitate modes of transport that reduce carbon emissions e.g by incorporating charging points for electric vehicles, subject to their appropriate design and location;
- Would reduce the negative impacts of road traffic, for example, congestion, air pollution and road accident casualties; and,
- Take account of the needs of road users according to a broad hierarchy consisting of, in order of priority:

    1. pedestrians and disabled people,
    2. cyclists, public transport,
    3. commercial access,
    4. general off peak traffic,
    5. general peak time traffic.

3.2.2 PFE - Addendum to Manchester Core Strategy

Following the adoption of the PfE document, the subsequent Core Strategy (CS) policies have been partially replaced by Places for Everyone (PfE) policies. Any part of the policy that is not replaced remains part of Manchester's Core Strategy.

CS Policy T1 Sustainable Transport: The following bullet point details what has been replaced:

- Take account of the needs of road users according to a broad hierarchy consisting of, in order of priority:

    - Pedestrians and disabled people
    - Cyclists, public transport,
    - Commercial access,
    - General off-peak traffic,
    - General peak time traffic.

    This policy was replaced by PfE Policy JP-CA1.

CS Policy EN4 Reducing CO_2 Emissions by Enabling Low and Zero Carbon Development: The following bullet point is what has been replaced:

- All development must follow the principle of the Energy Hierarchy.

  This policy was replaced by PfE Policy JP-S2.

CS Policy EN6 Target Framework for CO_2 Reductions from Low or Zero Carbon Energy Supplies: The following aspects of the policy have been replaced:

- The CO_2 emissions reduction targets and the target framework development locations

  This policy was replaced by PfE Policy JP-S2.

CS Policy EN8 Adaption to Climate Change: The following bullet point details what has been replaced:

- Minimisation of flood risk by appropriate siting, drainage, and treatment of surface areas to ensure rainwater permeability; and,
- The opportunity to provide linked and diverse green space to enhance natural habitats which will assist species adaptation.

  This policy was replaced by PfE Policies JP-S2, JP-S4 and JP-G8.

CS Policy EN14 Flood Risk: The following bullet point details what has been replaced:

- All new development should minimise surface water run-off, including through Sustainable Drainage Systems (SUDS) and the appropriate use of Green Infrastructure. Developers should have regard to the surface water run-off rates in the SFRA User Guide. In CDAs, evidence to justify the surface water run-off approach / rates will be required.

  This policy was replaced by PfE Policy JP-S4.

CS Policy EN15 Biodiversity and Geological Conservation: The following aspects of the policy have been replaced:

Development should wherever possible seek to maintain, enhance or restore existing geology.

This policy was replaced by PfE Policy JP-G8.

CS Policy EN17 Water Quality: The following bullet point details what has been replaced:

- Development should minimise surface water run-off from development and associated roads, and maximise the use of appropriate sustainable drainage systems, to minimise groundwater contamination, and to avoid pollutants reaching watercourses.

  Replaced by PfE Policy JP-S4

These elements of the above policies have therefore been removed from the previous Local Planning Policy section.

3.3 Regional Planning Policy

3.3.1 Places For Everyone

Places for Everyone (PfE) is the joint development plan of nine Greater Manchester local authorities (Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford, and Wigan) dealing with strategic planning issues including jobs, homes, transport, and the natural environment.

All nine authorities adopted the PfE Plan on 21st March 2024. Therefore, this document now forms part of the statutory development plan for each of the nine PfE authorities.

As a result, the following polices have been considered as part of the proposed development:

Policy JP-S1: Sustainable Development: To help tackle climate change, development should aim to maximise its economic, social and environmental benefits simultaneously, minimise its adverse impacts, utilise sustainable construction techniques and actively seek opportunities to secure net gains across each of the different objectives.

In bringing forward previously developed sites for development, particular attention will be paid to tackling land contamination and stability issues, ensuring that appropriate mitigation and remediation is implemented to enable sites to be brought back into use effectively.

Addressing Climate Change

Greater Manchester's Vision is to be at the forefront of action on climate change and to make its fair contribution to international commitments by becoming a carbon neutral city region by 2038.

To meet the carbon commitments, the following will be required:

- Be carbon neutral by 2038;
- Hold cumulative carbon dioxide emissions to within the council's carbon budget; and,
- Initiate a programme of mitigation to reduce emissions including by:
    - Significantly upscaling solar photovoltaic energy;
    - Reducing heat demand in homes;
    - Moving away from carbon intensive gas as the primary source of heat; and,
    - Increasing biofuel use.

- In supporting Greater Manchester's ambitions, climate change is a key theme running throughout the plan, rather than being reduced to a single policy, and it is only through this combination of actions that it can be properly addressed. In particular:

    - Methods to de-carbonise the city region through new and existing development, effective land management and through the provision of infrastructure and new technologies Policy JP-S2 'Carbon and Energy'; and,
    - The delivery of renewable and low carbon energy schemes Policy JP-S3 'Heat and Energy Networks'.

Carbon and Energy

- Meeting the 2038 carbon neutrality target will require a radical transformation across a range of sectors to drive carbon reduction. Within this, new development will have a critical role to play and all new homes and commercial/industrial buildings will need to achieve net zero carbon by 2028.

- It is expected that development in the plan area will apply a net zero carbon approach to operational emissions up until 2028, thereafter emissions in construction should be considered. Minimum carbon reduction targets will be set in line with the Future Homes Standard of 80% or until such a time this is superseded.

- From 2025, applicants will need to demonstrate carbon reductions have been maximised with an opportunity to offset any residual carbon to a carbon offset fund. The approach will be reviewed in line with future standards as they are introduced.

- By following the energy hierarchy, new development will need to achieve net zero carbon through the maximisation of on-site measures first. However, circumstances where a development has demonstrated that the hierarchy has been followed and there are no reasonable alternatives to meet the minimum carbon reductions, then payment to offset remaining emissions will also be required. Such payments should be expected to fund other carbon saving programmes within Greater Manchester to help meet the 5 Year Environment Plan targets.

Policy JP-S 2 – Carbon and Energy: The aim of delivering a carbon neutral Greater Manchester no later than 2038, with a dramatic reduction in greenhouse gas emissions, will be supported through a range of measures including:

- Promoting the use of life cycle cost and carbon assessment tools to ensure the long-term impacts from development can be captured;

- Taking a positive approach to renewable and low carbon energy schemes, particularly schemes that are led by, or meet the needs of local communities;
- An expectation that new development will, unless it can be demonstrated that it is not practicable or financially viable;

    - Be net zero carbon which applies:

        - From adoption – to regulated operational carbon emissions;

    - From 2025 development should also calculate and minimise carbon emissions from unregulated emissions alongside regulated emissions;

    - Development proposals should set out how this has been achieved in an energy statement in accordance with the energy hierarchy, which in order of importance seeks to:

        - Minimise energy demand;
        - Maximise energy efficiency;
        - Use renewable energy;
        - Use low carbon energy; and
        - Utilise other energy sources.

- From 2025 any residual carbon emissions that cannot be fully mitigated onsite should be offset, in agreement with the relevant local planning authority, through a financial contribution to a carbon offset fund;

- As an interim measure, development should be consistent with the 2021 Part L Building Regulations unless superseded by changes to building regulations and/or national or local planning policies.

    - Where practicable, prioritise connection to a renewable energy/heating/cooling network in the first instance or a low carbon energy/heating/cooling network that is adaptable to non-fossil fuels at a later date; and,

- For renewable energy generation priority should be given to PV installation where technically feasible, alternative technologies will be appropriate where the equivalent generation is evidenced;

- For non-residential developments, achieve at least BREEAM excellent standard (or equivalent) for the 'Ene 01 – reduction of energy use and carbon emissions' category rising to 'BREEAM outstanding' equivalent for ENE 01 from 2028;

- Include a detailed energy statement to demonstrate via site relevant evidence how the development has sought to maximize reductions in carbon emissions in line with relevant policy targets, including the minimisation of overheating risks and appropriate measures for post occupancy evaluation. Whole life cycle emissions should be considered where possible.

- Districts Local Plans may set out specific carbon emission reduction and energy demand targets within Local Plans.

Policy JP-STRAT14 - A Sustainable and Integrated Transport Network: New development will have a significant role in delivering a sustainable and integrated transport network in order to reduce car dependency and increase levels of walking, cycling and public transport.

Policy JP-S3 – Heat and Energy Networks: The provision of decentralised energy infrastructure is critical to the delivery of our objectives for low carbon growth, carbon reductions and an increase in local energy generation. The following measures will help to achieve this:

1. Delivery of renewable and low carbon energy schemes will be supported with particular emphasis on the use of decentralised energy networks in areas identified as "Heat and Energy Network Opportunity Areas". These have been identified where:

    a. Existing heat/energy networks are operational or have been commissioned;
    b. Sufficient density of existing heat demand occurs; and,
    c. Significant future development is proposed at the strategic development locations.

2. Within the identified "Heat and Energy Network Opportunity Areas", unless it can be demonstrated that there are more effective alternatives for minimising carbon emissions or such connection is not practicable or financially viable.

Policy JP-S4 - Flood Risk and the Water Environment: An integrated catchment-based approach will be taken to protect the quantity and quality of water bodies with reference to the North West River Basin Management Plan and managing flood risk, by:

- Working with natural processes and adopting a natural flood management approach to slow the speed of water drainage and intercept water pollutants;
- Locating and designing development so as to minimise the impacts of current and future flood risk, including retrofitting or relocating existing developments, infrastructure and places to increase resilience to flooding;
- Expecting developments to manage surface water runoff through sustainable drainage systems and as close to source as possible;
- Development should achieve greenfield run-off rates unless it is demonstrated to be impracticable; and,
- Ensuring that sustainable drainage systems:

    - Are designed to provide multifunctional benefits wherever possible, including for water quality, nature conservation and recreation;
    - Avoid adverse impacts on water quality and any possibility of discharging hazardous substances to ground;
    - Are delivered in a holistic and integrated manner, including on larger sites split into different phases; and
    - Are managed and maintained appropriately to ensure their proper functioning over the lifetime of the development.

- As a minimum, residential development should meet the mandatory water efficiency standard of 125 litres/person/day as set out in Building Regulations. District local plans may and should consider setting a tighter water efficiency standard of 110 litres/person/day where there is a clear local need with reference to national guidance on housing optional technical standards.

Policy JP-S6 - Resource Efficiency: The achievement of a circular economy and a zero-waste economy will play a key role in meeting Greater Manchester's ambition of becoming a leading green city region by 2038. The following measures will help achieve this:

- Development and implementation of the Zero Waste Strategy for Greater Manchester which promotes overall reduction in the level of waste produced and supports resource efficiency within the Plan area in order to gain the maximum value from the things we produce;
- Recognition of the role of existing infrastructure in managing our waste and protecting such facilities to ensure adequate waste management capacity is maintained; and
- Using sustainable design and construction techniques to reduce carbon emissions, adapt and future proof to the impact of climate change, reduce and recycle waste and minimise water use.

Policy JP-G2 – Green Infrastructure Network: A strategic approach will be taken to the protection, management and enhancement of Greater Manchester's Green Infrastructure in order to protect and enhance the ecosystem services which the Green Infrastructure Network provides, including flood management, climate change mitigation and adaptation.

Wherever practicable, opportunities to integrate new and existing green infrastructure into new development will be taken to protect, enhance and expand the green infrastructure network.

Policy JP-G6: Urban Green Space: To ensure there is an appropriate scale, type, quality and distribution of accessible urban green space that can support a high quality of life and other important green infrastructure functions:

- Existing urban green space will be protected and enhanced in balance with other considerations; and
- Developers and other stakeholders will be required to deliver new high quality urban green spaces.

Development should be designed to support the positive use of nearby green spaces, such as by offering a high-quality setting, providing natural surveillance, and facilitating easy access by walking and cycling.

Policy JP-G7 - Trees and Woodland: the aims and objectives of the Greater Manchester Tree and Woodland Strategy, aiming to significantly increase tree cover, protect and enhance woodland, and connect people to the trees and woodland around them.

This will be done through local planning and associated activities such as:

- Where development would result in the loss of existing trees, requiring replacement on the basis of two new trees for each tree lost, or other measures that would also result in a net enhancement in the character and quality of the treescape and biodiversity value in the local area, with a preference for on-site provision; and
- Protecting trees and woodland during the construction phase of development.

Policy JP-G8: A Net Enhancement of Biodiversity and Geodiversity: Through local planning and associated activities a net enhancement of biodiversity resources will be sought, including, where relevant, by:

- Increasing the quality, quantity, extent and diversity of habitats, particularly priority habitats identified in national or local biodiversity action plans and those that support priority species;
- Improving connections between habitats, to protect and enhance the provision of corridors, ecological networks (including Nature Recovery Networks) and steppingstones that enable the movement of species, especially as the climate changes;
- Enhancing the management of existing habitats, including through habitat restoration, avoiding habitat fragmentation and combating invasive species;
- Protecting sites designated for their nature conservation and/or geological importance, with the highest level of protection given to international and then national designations;
- Facilitating greater access to nature, particularly within urban areas;
- Supporting the development and implementation of the Great Manchester Wetlands Nature Recovery Network; and
- Safeguarding, restoring and sustainably managing our most valuable soil resources, tackling soil degradation/erosion and recovering soil fertility.

Development will be expected to:

- Follow the mitigation hierarchy of:
    - Avoiding significant harm to biodiversity, particularly where it is irreplaceable, through consideration of alternative sites with less harmful impacts, then
    - Adequately mitigating any harm to biodiversity, then
    - Adequately compensating for any remaining harm to biodiversity.
- Achieve a measurable net gain in biodiversity of no less than 10%; and,

- Development proposals should be informed by the findings and recommendations of the appropriate biodiversity/ecological assessment(s) in the PfE evidence base and/or any updated or appropriate biodiversity/ecological assessments submitted as part of the planning application process.

Policy JP-P1 - Sustainable Places: The aim is to become one of the most liveable city regions in the world, consisting of a series of beautiful, healthy and varied places, each having the following key attributes that all development, wherever appropriate, should be consistent with:

- Distinctive, with a clear identity that:
    - Conserves and enhances the natural environment, landscape features, historic environment and local history and culture;
    - Enables a clear understanding of how the place has developed; and
    - Respects and acknowledges the character and identity of the locality in terms of design, siting, size, scale and materials used.
- Resilient, capable of dealing with major environmental events;
- Adaptable, able to respond easily to varied and changing needs and technologies;
- Durable, being built to last and using robust materials that reflect local character, weather well and are easily maintained;
- Resource-efficient with:
    - A low carbon footprint;
    - Efficient use of land;
    - Minimised use of new materials; and,
    - High levels of recycling,
- Supported by critical infrastructure, such as energy, water and drainage and green spaces; and,
- Functional and convenient, enabling people and uses to act efficiently with minimal effort, and responding to needs relating to servicing, recycling facilities, refuse collection and storage.

3.4 Manchester's Great Outdoors

The Green and Blue Infrastructure Strategy for Manchester aims to invest in the city's green and blue infrastructure over the next ten years (by 2025). Four objectives have been established to enable the vision to be achieved:

1. Improve the quality and function of existing green and blue Infrastructure, to maximise the benefits it delivers.

2. Use appropriate green and blue infrastructure as a key component of new developments to help create successful neighbourhoods and support the city's growth.

3. Improve connectivity and accessibility to green and blue infrastructure within the city and beyond.

4. Improve and promote a wider understanding and awareness of the benefits that green and blue infrastructure provides to residents, the economy and the local environment.

3.5 Climate Emergency

On 10th July 2019, a motion asking Manchester City Council (MCC) to formally declare a **climate emergency** was unanimously agreed. The motion declares that climate change is a serious risk to Manchester's future. Manchester is committed to embedding the issue as an integral part of council decision-making – making sure that all key decisions are taken with the city's target of becoming zero-carbon by 2038 in mind. The council has agreed the following:

- To deliver the 2038 zero carbon target and determine if an earlier target can be possible;
- Make climate breakdown and the environment an integral part of activity throughout the council, including all decision making, ensuring key decisions take into account the impact on achieving the zero-carbon target;
- Investigate and introduce measures to help reach domestic zero carbon levels, including addressing fuel poverty and retrofitting existing homes; and
- Investigate ways to ensure that future local plans place a mandatory requirement for all new development to be net zero carbon by the earliest possible date.

In March 2020 the Executive adopted the Manchester Climate Change Framework 2020-2025. The five-year framework sets out measures that MCC will take in order to reduce carbon emissions from its buildings, energy use and transport. Measures include retrofitting buildings to improve energy efficiency, increasing the use of electric vehicles, and seeking 100% renewable energy. Whilst this has also not been formally adopted into planning policy, it is a key consideration for future development proposals.

3.6 Regulatory Framework

Building Regulations, Part L - Conservation of Fuel and Power sets the compliance standards for energy demand and carbon dioxide emissions from buildings. Guidance on how to meet the requirements of this regulation is provided within a number of approved documents. The relevant document is referenced below:

Approved Document Volume 1: Dwellings (2021 edition): Gives guidance on how to comply with Part L of Schedule 1 to the Building Regulations and the energy efficiency requirements for dwellings.

Minimum energy performance requirements shall be approved and expressed in accordance with the methodology for new dwellings in the form of:

- Target carbon dioxide (CO_2) emission rates;
- Target fabric efficiency rates; and,
- Target primary energy rates.

3.7 Applicable Targets

Based upon a review of relevant planning policy requirements, legislative drivers, and client priorities, the following list provides a brief precis of the key criteria that should be targeted for this development:

Places for Everyone

- Policy JP-S1: Sustainable Development
- Policy JP-S2: Carbon & Energy
- Policy JP-STRAT14: A Sustainable and Integrated Transport Network
- Policy JP-S3: Heat and Energy Networks
- Policy JP-S4: Flood Risk and the Water Environment
- Policy JP-S6: Resource Efficiency
- Policy JP-G2: Green Infrastructure Network
- Policy JP-G6: Urban Green Space
- Policy JP-G7: Trees and Woodland
- Policy JP-G8: A Net Enhancement of Biodiversity and Geodiversity
- Policy JP-P1 Sustainable Places

Manchester Core Strategy

- Policy EN 4 - Reducing CO_2 Emissions by Enabling Low and Zero Carbon Development
- Policy EN 5 - Strategic Areas for low and zero carbon decentralised energy infrastructure
- Policy EN 6 - Target Framework for CO_2 Reductions from Low or Zero
- Policy EN 8 – Adaption to Climate Change
- Policy EN9 - Green Infrastructure
- Policy EN14 – Flood Risk
- Policy EN15 – Biodiversity and Geological Conservation
- Policy EN16 – Air Quality
- Policy EN19 – Waste
- Policy DM1 – Development Management
- Policy T1 - Sustainable Transport

Guide to Development in Manchester, Supplementary Planning Document

Manchester City Council Climate Emergency Declaration

Building Regulations, Part L

- Approved Document Volume 1: Dwellings (2021 edition)

4. SUSTAINABILITY STATEMENT

This section provides an appraisal of the development proposals and details the specific approach, design features and specifications which will contribute to reducing the environmental impact of this scheme. This section outlines those commitments that have been made to ensure this scheme contributes to sustainable development and meets the council's policy aims.

4.1 Energy Performance

In order to limit energy demand and carbon dioxide (CO_2) emissions from the operation of the building, have identified a number of design features that will be integrated that will collectively contribute towards the emissions reduction target for the scheme.

The energy strategy proposed is an enhanced 'fabric led' solution coupled with the inclusion of an energy efficient servicing provision to maximise the buildings' performance.

The reduction in energy demand to meet the carbon reduction targets will be achieved through the following design measures and low carbon technology options:

- Improved thermal insulation;
- Low air permeability;
- Photovoltaic array:
- Electric panel heaters;
- Efficient air source heat pumps; and,
- Low energy LED lighting.

These measures will secure the carbon reduction targets sought by the local planning authority and **Building Regulations Part L: Approved Document Volume 1 (2021 edition).**

Full details of the energy and carbon strategy for the development can be viewed within Appendix A of this report.

4.2 Flood Risk and Surface Water Management

A flood risk assessment was produced for the site by Booth King Partnership Ltd utilising information from the Environment Agency Flood Risk Maps. The report concluded that the site lies predominantly within Flood Zone 3 with a small portion situated within Flood Zone 2 as demonstrated within Figure 4.1 below.

Due to the high flood risk identified, hydraulic modelling was undertaken by JBA Consulting which suggests the site is actually of a low risk of flooding with only a 0.1% Annual Exceedance Probability (AEP) event affecting the site. Climate change scenarios indicate potential access route flooding via Commercial Street but no direct flooding to the main site. Based off this, the following mitigation measures have been recommended:

- All habitable accommodation at first floor or above,

- Flood-resilient ground floor construction (e.g. solid floors, waterproof materials, raised electrics, non-return valves); and,

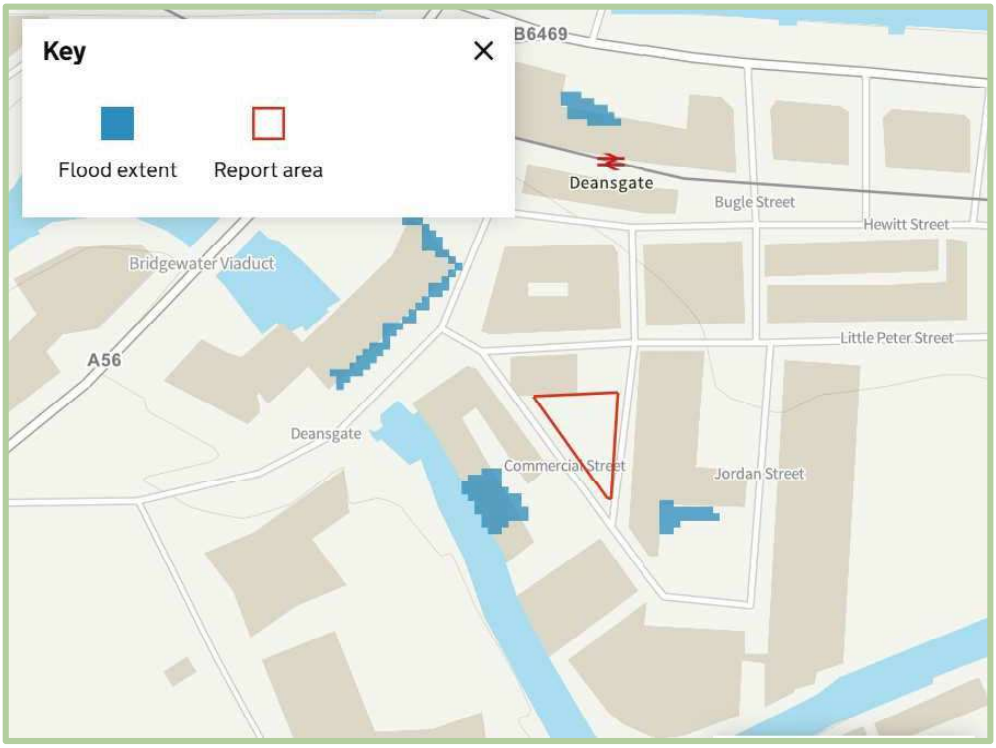
- Safe evacuation route identified to higher ground; commitment to EA flood warning registration.

Figure 4.1 – Environment Agency Flood Risk Zone Map



Figure 4.2 demonstrates that the area is at low risk from surface water flooding as well, with a chance of flooding of less than 0.1% each year.

Figure 4.2 – Flood Risk from Surface Water Map



Hydraulic modelling indicates the site is to be at low risk of flooding and therefore in accordance with **Policy EN14** the proposed development is not considered to be in an area at high risk of flooding. However, **mitigation measures** have been proposed to **reduce the risk of future flooding** as a consequence of climate change.

4.2.1 Drainage Strategy

A sustainable drainage strategy has been produced by Booth King Partnership Ltd which outlines the following possible drainage solutions which will be utilised to manage any flood risk on site:

- Infiltration is unsuitable due to low-permeability soils.
- Surface water will be discharged to the public combined sewer via flow control devices (hydro-brakes), restricted to a minimum of 5.0 l/s in accordance with LLFA requirements.
- SuDS features include green/blue roofs, planting for biodiversity, and measures to enhance water quality.
- Climate change allowance of +45% rainfall applied to storage design.

In accordance with **PfE Policy JP-S4 - Flood Risk and the Water Environment** the proposed development will seek to **manage surface water runoff through sustainable drainage systems and as close to source as possible.**

4.3 Materials

The proposals will also contribute towards making more efficient use of non-renewable materials resources, and to reducing the lifecycle impact of materials used in construction. This is demonstrated by:

- Materials will be selected based on their environmental performance and how they will be sourced. Indirect carbon emissions will therefore be taken into account, including those involved in the extraction/cultivation, manufacture and handling processes; and subsequent, in-life emissions resulting from the use of those materials in development.
- Materials with a low environmental impact throughout their life cycle will be prioritised within the new build and extension buildings. Plus, materials with associated Environmental Performance Declarations (EPD's) will be favoured.
- Responsibly sourced materials from suppliers operating an Environmental Management System and procuring timber verified by either the Forest Stewardship Council (FSC) or Programme for the Endorsement of Forest Certification standard (PEFC) will be prioritised;
- Material selection will be carefully considered to avoid the use of toxic materials, such as Volatile Organic Compounds (VOCs) and contribute towards creating a healthy indoor environment; and,

- Local sourcing of construction materials where feasible and viable will minimise the impact of carbon dioxide emissions associated with the transportation of materials.

Local sourcing of construction materials where feasible and viable will minimise the impact of carbon dioxide emissions associated with the transportation of materials. In addition to this, **materials with low levels of embodied carbon will be prioritised in accordance with Core Strategy Policy EN4.**

4.4 Water Efficiency

The proposed development will be designed to reduce mains / potable water consumption and will include the following water efficient designs and equipment:

- A water efficiency strategy will be determined for the site and will include for the provision of 'A' rated appliances as a minimum;
- In order to reduce water demand, the sanitary fixtures will be specified to achieve a calculated daily consumption of <110 litres/person/day in line with **PfE Policy JP-S4 - Flood Risk and the Water Environment;**
- A water meter on the mains water supply to the building will be specified to monitor and manage consumption.

Efficient water fixtures will be specified throughout the building such as low flow taps, showers and dual flush WCs in order to reduce water consumption**.**

4.5 Ecology and Biodiversity

E3P have produced a Biodiversity Net Gain (BNG) exemption statement for the proposed development. The findings from their statement are summarised below:

- The existing site comprises of a car park approximately 430 m² of gravel/aggregate which has been colonized around the periphery by ruderal vegetation.
- The habitats present on site would be mapped as artificial unvegetated, unsealed surface under the UKHAB habitat classification which would receive an ecological value of 0 units within the Statutory Biodiversity Metric Calculation Tool.
- No linear habitats or watercourses are impacted by the proposed development.
- The site meets the De-minis threshold, as less than 25 m² of non-priority onsite habitats with a biodiversity value greater than zero will be affected by the development. Therefore, compliance with BNG under Schedule 7A of the Town and Country Planning Act 1990 is not required.

Whilst the development does not have to comply with the 10% BNG target, there is a requirement under **Policy EN15 – Biodiversity and Geological Conservation and Policy JP-G8: A Net Enhancement of**

Biodiversity and Geodiversity for developments within Manchester to seek to enhance the biodiversity throughout the city.

Current proposals illustrate that private roof gardens are to be provided to each of the town houses. These garden areas will be designed to provide enhancements to biodiversity on site.

The development is exempt from compliance with BNG however in accordance with both Manchester's Core Strategy Policy EN15 – Biodiversity and geological Conservation and the Places for Everyone Policy JP-G8, the proposed development will protect and enhance the biodiversity value of the proposed site.

4.6 Waste Management

4.6.1 Construction Waste

Best practice techniques to prevent and minimise waste during the design and construction phase of the development will be adopted, as follows:

- Prior to commencement of the above ground construction phase, a site waste management plan (SWMP) will be produced by the developer to limit the on and off-site environmental impacts of construction:

- The SWMP will encompass:

    - Recycled and secondary; materials;
    - Waste reduction;
    - Waste segregation;
    - Waste recovery; and,
    - Waste disposal.

- **This development will promote the minimisation of waste arising and seek to maximise the use** of recycled materials in construction.

- The principal contractor will implement sound environmental management practices and consideration for neighbouring sites during their activities on-site.

In accordance with **EN19 – Waste** the **waste management plan** will be prepared to **demonstrate how both construction and demolition waste will be minimised, and recycled on site wherever possible, and how the sustainable waste management needs of the end user will be met.**

4.6.2 Operational Waste

The operational waste strategy for the scheme focuses on the segregation of waste at source, in order to maximise the potential for building users to recycle. All users will be informed on collection frequency, as well as guidance on local recycling facilities to assist with the management and storage of waste.

A waste management strategy will be developed in compliance with the policies of Manchester City Council to optimise recycling rates.

The proposed development will be designed to be functional and convenient, **enabling people to act efficiently with minimal effort, and responding to needs relating to servicing, recycling facilities, refuse collection and storage** in accordance with **PfE Policy JP-P1.**

4.7 Pollution

To reduce the schemes impact on the surrounding communities and environments, the proposals will include the following:

- The external lighting strategy will be designed to reduce unnecessary light pollution through effective design, energy consumption and nuisance to neighbouring properties;
- The 'full electric' energy strategy will not generate local emission to air;
- Pollution Prevention Guidance will be adhered to in respects of air (dust) and water (ground and surface) pollution during the demolition and construction phase; and,
- Dust suppression measures will also be put in place as part of the Main Contractor's Environmental Management Plan, such that any potential risks to watercourses or the neighbouring properties are minimised.

The principal contractor will put measures in place to ensure that the surrounding area will not be polluted as a direct result of the activities on site during the construction phase.

4.8 Health and Wellbeing

To enable the occupants of the proposed development to lead lower impact lifestyles and enhance their quality of life, the following measures will be delivered:

- The thermal comfort performance of the proposed development will be optimised to provide a healthy living environment for its occupants;
- The private garden areas on the roof of each townhouse will allow building users to interact with nature;
- The proposed design will create a close community allowing users to socialise and improving community engagement;

Good levels of natural day lighting will be achieved within the proposed development. This will improve wellbeing for the building users and reduce the need for energy to light proposed development.

4.9 Transport

A Transport Statement has been produced by Eddisons and a review of the most appropriate and sustainable modes of transport has been conducted, in order to assess the feasibility of each transport option available to the future occupiers of the proposed development. The conclusions that can be drawn from this appraisal are as follows:

4.9.1 Public transport

- The nearest bus stops to the site are located on Whitworth Street West which can be accessed in less than a two-minute walk form the development. Multiple services are available from this transport node which provide access to Manchester City Centre, Trafford, Flixton, Carrington and Picadilly Gardens.

- Deansgate Railway Station is located within a one-minute walk from the development. The station has two platforms offering ten services per hour to destinations such as Blackpool North Manchester Airport, Liverpool Lime Street, Southport and Manchester Oxford Road throughout the week.

- The nearest tram stop to the site is Deansgate Castlefield which has three platforms offering services to destinations such as Altringham, Bury, Picadilly, Ashton Under Lyne, Eccles, Media City, East Didsbury, Rochdale, Trafford Centre, Shaw and Crompton and Manchester Airport.

- The site has a GMAL score of 8 and can therefore be considered to have a high level of public transport accessibility.

4.9.2 Cycling and Walking

- To the north of the site along Deansgate major cycling friendly infrastructure has been introduced with cycle lanes all the way along the road and improvements to junctions to prioritise cyclists.

- Garages are to be provided on the ground floor of each of the town houses which can be utilised as secure cycle storage;

- There are footways provided along the streets leading away from the development, which can be used to access local transport links, including bus, train and tram; and,

- There is also a vast array of local amenities within both suitable walking and cycling distances from the development.

Due to the site's proximity to local amenities and the presence of public transport services within easy walking distance, **the site is considered to be well located to encourage trips to be made on foot, bicycle or via public transport.**

5. CLIMATE CHANGE EMERGENCY

On 10th July 2019, a motion asking Manchester City Council (MCC) to formally declare a **climate emergency** was unanimously agreed. In support of this, the developer wishes to highlight the following measures that will form part of the specification of this development:

- An energy strategy that delivers carbon dioxide emission reductions and renewable energy generation in line with the Energy Hierarchy:
    - In securing compliance with the current, stringent building regulation Part L targets, a commitment is made to construct high quality, energy efficient residential properties which will minimise demand side energy loads – in accordance with the principles of the energy hierarchy.
    - Photovoltaic arrays and air source heat pumps will be installed to meet the renewable energy requirements of the scheme.
- A site waste management plan (SWMP) will be produced by the developer to limit the on and off-site environmental impacts of construction waste.
- The development will be designed to incorporate features that will serve to reduce energy demand, and in turn, carbon emissions arising from access to the building:
    - ASHP systems;
    - Photovoltaic array;
    - Electric panel heaters; and,
    - LED lighting.
- The site is well located to encourage trips to be made on foot, by bike or via public transport. This is facilitated by:
    - Bus stops along Medlock Street;
    - The nearest Metrolink stop is the Deansgate Castlefield Stop; and,
    - Garages can be utilised as secure cycle storage
- Roof terraces will be provided which can address biodiversity enhancement on site.

These commitments, in combination, seek to work towards the carbon reduction target of no more than 1.5°C global temperature increase and assist the council in meeting their Climate Change Emergency objectives.

6. CONCLUSION

This Statement has reviewed the sustainability performance of the proposed Knott Mill development against national and local planning policies. The conclusions that may be drawn from the review are as per the following:

Sustainability Performance –

- **Hydraulic modelling indicates the site is to be at low risk of flooding** and therefore in accordance with **Policy EN14** the proposed development is not considered to be in an area at high risk of flooding. However, **mitigation measures** have been proposed to **reduce the risk of future flooding** as a consequence of climate change.

- The scheme will be specified with **efficient water fixtures and controls**. This will achieve a calculated daily consumption of **<110 litres/person/day in line with Policy JP-S4 - Flood Risk and the Water Environment.**

- Local sourcing of construction materials where feasible and viable will minimise the impact of carbon dioxide emissions associated with the transportation of materials. In addition to this, **materials with low levels of embodied carbon will be prioritised in accordance with Core Strategy Policy EN4.**

- This scheme **promotes access to sustainable modes of transport** which will contribute towards creating a highly connected and sustainable development in accordance with **Policy T1**. The scheme as a result achieves a **GMAL rating of 8.**

- Due to the site's proximity to local amenities and the presence of public transport services within easy walking distance, **the site is considered to be well located to encourage trips to be made on foot, bicycle or via public transport.**

- In accordance with **EN19 – Waste** the **waste management plan** will be prepared to **demonstrate how both construction and demolition waste will be minimised, and recycled on site wherever possible, and how the sustainable waste management needs of the end user will be met.**

- The proposed development will be designed to be functional and convenient, **enabling people to act efficiently with minimal effort, and responding to needs relating to servicing, recycling facilities, refuse collection and storage** in accordance with **PfE Policy JP-P1.**

- **The development is exempt from compliance with BNG however in accordance with both Manchester's Core Strategy Policy EN15 – Biodiversity and geological Conservation and the Places for Everyone Policy JP-G8, the proposed development will protect and enhance the biodiversity value** of the proposed site.

- **Good levels of natural day lighting will be achieved** within the proposed development. This will provide a good quality of life for the building users and reduce the need for energy to light proposed development

- **The principal contractor will put measures in place to ensure that the surrounding area will not be polluted** as a direct result of the activities on site during the construction phase.

Energy Strategy –

The scheme will be designed and specified in accordance with **the principles of the energy hierarchy** and improves upon the **carbon dioxide (CO_2) reduction targets and guidance set by Manchester City Council:**

- The proposed scheme will be compliant with building regulation Part L Volume 1 (2021).
- The proposed material and mechanical specification will provide various benefits including; **upgraded thermal insulation, highly efficient mechanical servicing, and low energy lighting.**
- The scheme will integrate **efficient air source heat pumps and Photovoltaic Array** in order to limit the carbon emissions arising from the scheme.
- Full details of the energy and caron strategy can be viewed within Appendix A of this report.

Furthermore, the proposals accord with the aims of the National Planning Policy Framework, as follows:

- The **re-use of the piece of land** will provide a development that inherently supports **sustainable accommodation space with access to local amenities and sustainable modes of transport**. The reuse of the site is also an efficient use of land and resources;
- **Construction practices that minimise adverse impacts on the environment** will be adhered to including a waste management strategy to reduce the quantity of waste generated, and to increase re-use and recycling, a commitment will be made to minimise waste and pollution; and,
- **Improving upon the regulatory Part L compliance criteria** will assist in lessening the impact of this development on the environment by way of reducing carbon emissions.

In conclusion, the proposed development will deliver a quality development that accords with the guidance provided within Manchester Core Strategy as well as national planning and regulatory standards.

Appendix A – Energy and Carbon Strategy

ELEMENT SUSTAINABILITY

KNOTT MILL

ENERGY AND CARBON STATEMENT

OCTOBER 2025

REF: 2025.170



ELEMENT SUSTAINABILITY – ISSUE NOTES

Project No:	2025.170
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Client:	Meadway Developments Ltd
Status:	Draft

Version:	1.0	
Date:	October 2025	
Prepared By 	Checked by: 	Approved by: 
Anita Kocsis Energy Assessor	Stacey Downes Principal Consultant	Laurie Wills Director

Version	Version Details	Date Issued	Issued by
0.0	Draft	9th October 2025	AK
1.0	Final	10th October 2025	EB

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1. EXECUTIVE SUMMARY

The purpose of this statement is to summarise the relevant policy background and requirements of Trafford Council and to demonstrate the ways in which the developer has addressed these aims through their proposals, ensuring all practicable measures have been taken to deliver a sustainable development at this site. This energy statement has been prepared in response to the local and regional planning policy guidance.

The application site is situated on Knott Mill. The proposed development consists of a residential development providing eight townhouses. Three key design variations are proposed for the scheme:

- Type 1 house type, c.194m^2 floor area
- Type 2 house type, c.242m^2 floor area
- Type 3 house type, c.233m^2 floor area

The Energy Hierarchy has been used as a framework to guide the energy strategy for this development to achieve practical and cost-effective carbon emission reductions. The form of the buildings proposed for the scheme is as follows:

- The 1 is an end terrace house type
- The 2 is a mid terrace house type
- The 3 is an end terrace house type

The calculated form factors for the house types have been calculated, as follows:

- Type 1 = 1.7
- Type 2 = 0.8
- Type 3 = 1.5

The proposed material specification to be incorporated within the scheme will limit heat loss and ensure efficient operation of the houses. Allied to this, the houses will benefit from continuously running extract ventilation fans. This achieves low power consumption, the low noise and the reduces life-cycle energy demand and costs.

Representative SAP models have been calculated for house types 1 and 2. This sample provides a robust indication of the overall performance of the development proposals. The space heating demand for the house types has been calculated, as follows:

- Type 1 = 11.34kWh/m^2/year
- Type 2 = 8.14kWh/m^2/year
- Type 3 = 15.2kWh/m^2/year

Both regulated + unregulated energy demand have been assessed for the purposes of the Energy Use Intensity (EUI) calculation. The EUI for the house types has been calculated, as follows:

- Type 1 = 25.34kWh/m^2/year
- Type 2 = 22.21kWh/m^2/year
- Type 3 = 22.21kWh/m^2/year

Photovoltaic (PV) arrays have been selected as an appropriate renewable energy technology to contribute to the CO_2 emission reduction target for the development and to support the requirements stipulated within Places for Everyone. The renewable energy balance for the house types has been calculated, as follows:

- Type 1 = 17.5%
- Type 2 = 11.9%
- Type C = 17.0%

The scheme will be fossil fuel free.

The proposed Air Source Heat Pump (ASHP) system that will be specified provides both space heating and hot water very efficiently. The proposed specification includes an Air Source Heat Pump (5kW) providing both main space heating and hot water. This example system operates with a COP of more than 300% efficiency.

The developer has completed dynamic simulation modelling (CIBSE TM59) analysis to assess and determine an appropriate overheating (building regulation, Part O) mitigation strategy.
No active cooling of these dwellings is required.

The proposals will contribute towards making more efficient use of non-renewable materials resources, and to reducing the lifecycle impact of materials used in construction.

2. ENERGY AND CARBON PROFORMA

The Energy and Carbon proforma for Minor Residential Developments is presented in Figure 2.1.

Figure 2.1 – Energy and Carbon Proforma

Energy and Carbon Proforma
Residential
Minor development *(2-9 homes)*
Version 1.0

GMCA GREATER MANCHESTER COMBINED AUTHORITY

Project Name: ICENI Projects, Knott Mill, Manchester
Application ref: TBC
Date: 10th October 2025

		Ref. name	Type 1	Type 2	Type 3
		No. dwellings	2	5	1
		Area (m² GIA)	194	242	233
		Target values	**Building 1**	**Building 2**	**Building 3**
Minimise energy demand	**Space heating demand (kWh/m²GIA/yr)**	*≤ 15 (flats) – 20 (houses)*	**11.34**	**8.14**	**13.48**
	Calculation methodology used to calculate space heating demand and confirmation that this covers all homes/blocks	*Predictive energy model*	SAP10	SAP10	SAP10
	Form factor per building	*≤ 2*	1.7	0.8	1.5
	Average external wall U-value (W/m²K)	*≤ 0.15*	0.15	0.15	0.15
	Average window U-value (W/m²K)	*≤ 1 (triple)*	1.2 (DG)	1.2 (DG)	1.2 (DG)
	Air permeability rate (m³/h/m² @ 50 Pa)	*≤ 1*	5	5	5
Maximise energy efficiency	**Energy use intensity (kWh/m²GIA/yr)**	*≤ 35*	**25.34**	**22.21**	**25.06**
	Calculation methodology used to calculate energy use intensity and confirmation that this covers all homes/blocks	*Predictive energy model*	SAP10	SAP10	SAP10
Use renewable energy	**PV footprint area (% of ground floor space)**	*≥ 40*	**<40%**	**<40%**	**<40%**
	Annual renewable energy generation (kWh/m² building footprint/yr)	-	4.4	2.6	4.2
	Renewable energy balance (%)	-	17.5	11.9	17
	Total energy used (kWh/yr)	-	2113	1881	3142
	Total energy generated on-site (kWh/yr)	-	862	650	995
Use low carbon energy	**Fossil fuel free (yes/no)**	*Yes*	**Yes**	**Yes**	**Yes**
	Heat source - *Where the system for generating space heating and hot water is a heat pump and it achieves a SCOP of 2.5 or higher (then a Low Carbon Heat Appraisal not required)*	*Electric*	ASHP (327%)	ASHP (327%)	ASHP (327%)
Reduce overheating risk	**Have Part O overheating requirements been met without the use of mechanical cooling?**	*Yes*	**Yes**	**Yes**	**Yes**
Minimise embodied carbon	**Confirmation** that a summary of the efforts made to design a lean, low carbon structure and building design has been submitted?	*Yes*	Yes	**Yes**	**Yes**

3. INTRODUCTION

Element Sustainability has been commissioned by Meadway Developments Ltd to review the energy performance of the proposed residential development in Knott Mill, Manchester

The purpose of this statement is to summarise the relevant policy background and requirements of Trafford Council and to demonstrate the ways in which the developer has addressed these aims through their proposals, ensuring all practicable measures have been taken to deliver a sustainable development at this site.

Details of the design attributes, specifications and characteristics of the scheme are appraised in order to demonstrate how the proposals contribute to an energy efficient development and seek to minimise the carbon emissions associated with the energy performance of the scheme.

This report is intended to support the planning application for this development and therefore, establish an approach to the delivery of this scheme which meets the criteria required by the council and which the developer commits to implement at the site.

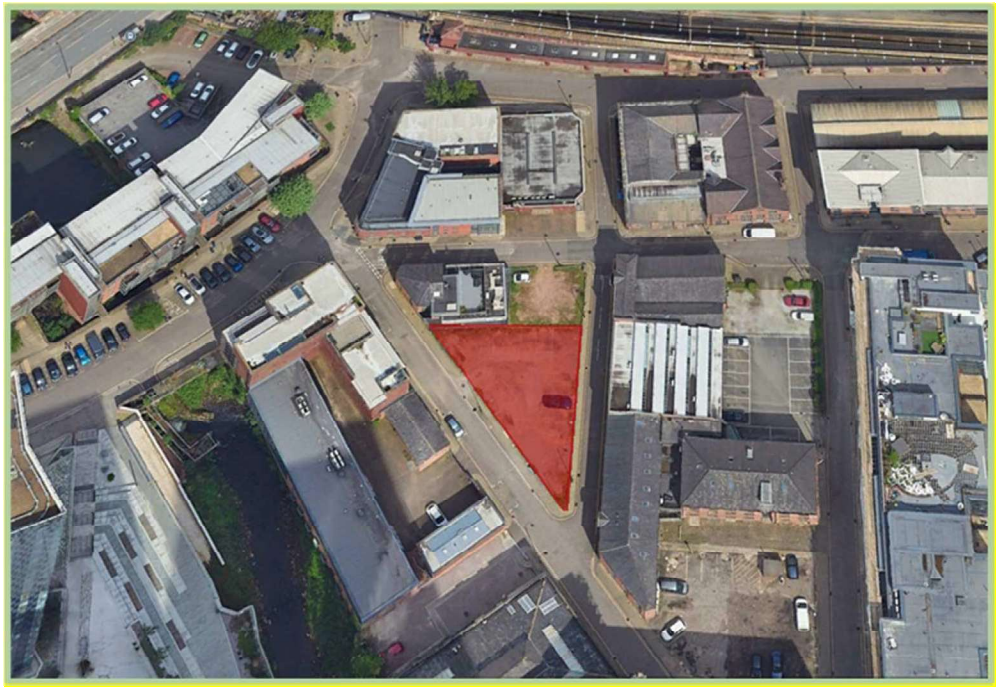
4. PROJECT OVERVIEW

4.1 Development Site Description

The application site is situated at the junction between Commercial Street and Constance Street in Castlefield, Manchester. Currently, the site comprises of a hardstanding car park. Limited features are present on site however towards the borders some vegetation in the forms of weeds and poorly established grasses can be noted. Low rise wooden fencing is present along the western, eastern and northeastern borders. The northwestern border is occupied by a two-storey building that extends to the north off the development footprint.

The extent of the proposed pre-development site plan is presented in Figure 4.1 below.

Figure 4.1 – Pre-Developed Site



4.2 Development Proposals

The proposed development consists of a residential development providing eight five-storey town houses.

Three key design variations are proposed for the scheme:

- 1no. Type 1 house type, c.194m^2 floor area
- 2no. Type 2 house type, c.242m^2 floor area

Figure 4.2 presents the proposed site location plan.

Figure 4.2 – Site Location Plan



The proposals also include the provision of private garden spaces and private driveways along with communal soft landscaping around the development. Figure 4.3 to 4.5 below present the elevations and floor plans for the proposed scheme.

Figure 4.3 – House Type 1 and 2, Proposed Elevations



Figure 4.4 – House Type 1 and 2, Proposed Floor Plans



5. POLICY REVIEW

5.1 National Planning Policy

The National Planning Policy Framework was revised on 12th December 2024 and sets out the government's planning policies for England and how these are expected to be applied.

The purpose of the planning system is to contribute to the achievement of sustainable development. The planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways, as set out below:

An economic objective – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;

A social objective – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations, and by fostering well-designed, beautiful and safe places, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and

An environmental objective – to protect and enhance our natural, built and historic environment, including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

These objectives should be delivered through the preparation and implementation of plans and the application of the policies in this framework. Planning policies and decisions should play an active role in guiding development towards sustainable solutions, but in doing so should take local circumstances into account, to reflect the character, needs and opportunities of each area.

5.2 Local Planning Policy

5.2.1 Manchester Core Strategy

Manchester's Core Strategy was adopted on the 11th July 2012 and remains the key document in the adopted Manchester Local Plan. It sets the out the long-term strategic policies for Manchester's future development and will form the framework that planning applications will be assessed against.

Policy EN 4 - Reducing CO_2 Emissions by Enabling Low and Zero Carbon Development: The council will seek to reduce fuel poverty and decouple growth in the economy, growth in CO_2 emissions, and rising fossil fuel prices, through the following actions:

Where possible new development and retrofit projects will be used as a mechanism to help improve energy efficiency and provide low and zero carbon energy supplies to existing buildings.

Where appropriate new development and retrofit projects will be required to connect to and / or make contributions to low or zero carbon energy schemes and / or to incorporate provision to enable future connection to any existing / potential decentralised energy schemes.

The use of building materials with low embodied carbon in new development and refurbishment schemes

Policy EN 5 - Strategic Areas for Low and Zero Carbon Decentralised Energy Infrastructure: Within Manchester it is considered that the following strategic areas, will have a major role to play in achieving an increase in the level of decentralised, low and zero carbon energy supplies available:

- The Regional Centre, which also includes the Oxford Road Corridor and Eastlands;
- District Centres and associated major development sites;
- Airport Strategic site;
- Strategic housing location; and,
- Strategic employment locations.

Within these areas new development, regeneration and retrofit projects will be expected to take place in the context of more detailed proposals for decentralised low and zero carbon energy infrastructure in the form of energy proposals plans.

Policy EN 8 – Adaption to Climate Change requires all new development to be adaptable to climate change in terms of the design, layout, siting and function of both buildings and associated external spaces. In achieving developments which are adaptable to climate change developers should have regard to the following, although this is not an exhaustive list:

- Reduction in urban heat island effect using green infrastructure such as green roofs, green walls, increased tree cover and waterways; and,
- The need to control overheating of buildings through passive design; and

Developers will be permitted to use green infrastructure elements such as green roofs, green walls, street trees and waterways to contribute to compliance with CO_2 mitigation under Policy EN6, subject to sufficient evidence to quantify their contribution to compliance.

Policy EN9 - Green Infrastructure: New development will be expected to maintain existing green infrastructure in terms of its quantity, quality and multiple function. Where the opportunity arises, and in accordance with current green infrastructure strategies, the council will encourage developers to enhance the quality and quantity of green infrastructure, improve the performance of its functions and create and improve linkages to and between areas of green infrastructure. Where the benefits of a proposed development are considered to outweigh the loss of an existing element of green infrastructure, the developer will be required to demonstrate how this loss will be mitigated in terms of quantity, quality, function and future management.

Policy EN14 – Flood Risk: The council requires developments to:

- Be directed away from sites at the greatest risk of flooding, and towards sites with little or no risk of flooding; this should take account of all sources of flooding identified in the Manchester-Salford-Trafford Strategic Flood Risk Assessment (SFRA).

Policy EN15 – Biodiversity and Geological Conservation: The council will seek to maintain or enhance sites of biodiversity and geological value throughout the city.

Developers will be expected to identify and implement reasonable opportunities to enhance, restore or create new biodiversity, either on-site or adjacent to the site, contributing to linkages between valuable or potentially valuable habitat areas where appropriate, with reference to:

- The Manchester Biodiversity Strategy, which provides further details of priority habitats within Manchester and opportunities for biodiversity enhancement including corridors such as the Mersey, Medlock and Irk River valleys, the canals and disused railway lines, and areas of managed greenspace particularly in parks;

- The Green Infrastructure Framework for Greater Manchester, which encompasses an ecological framework that seeks to guide and inform habitat creation and repair, including identifying large 'biodiversity opportunity areas' including the Moston Brook Corridor and Nutsford Vale;

    - Manchester's Climate Change Action Plan;
    - The Strategic Flood Risk Assessment (SFRA) for Manchester;
    - The River Basin Management Plan for the North West; and,
    - The Manchester Tree Strategy.

Any adverse impacts on biodiversity will need to be justified against the wider benefits of the proposal, assessed against other Local Development Framework policies. Where adverse impacts are unavoidable, developers will be required to provide appropriate mitigation and / or compensation. Development should, wherever possible, seek to maintain, enhance or restore existing geology.

Policy EN16 – Air Quality: The council will seek to improve the air quality within Manchester, and particularly within Air Quality Management Areas. Developers will be expected to take measures to minimise and mitigate the local impact of emissions from traffic generated by the development, as well as emissions created by the use of the development itself.

Policy EN17 – Water Quality: The council require:

- New developments to avoid any adverse impact on water quality, including during the construction phase, and wherever possible should seek to enhance water quality, both chemical and ecological.

Policy EN19 – Waste: The council will:

- Require all developers, including those of new waste management facilities within the district, to demonstrate the proposal's consistency with the principles of the waste hierarchy (prevention, reduction, re-use, recycling/composting, energy recovery, final disposal);

- Require all developers to submit a waste management plan to demonstrate how both construction and demolition waste will be minimised, and recycled on site wherever possible, and how the sustainable waste management needs of the end user will be met; and,

- Encourage communities to take responsibility for the waste they create through the provision of accessible facilities.

Policy DM1 – Development Management: All development should have regard to the following specific issues, for which more detailed guidance may be given within a supplementary planning document:

- Accessibility: buildings and neighbourhoods fully accessible to disabled people, access to new development by sustainable transport modes;
- Community safety and crime prevention;
- Design for health;

- Adequacy of internal accommodation and external amenity space;
- Refuse storage and collection;
- Effects relating to biodiversity, landscape, archaeological or built heritage;
- Green infrastructure including open space, both public and private;
- The use of alternatives to peat-based products in landscaping/gardens within development schemes;
- Flood risk and drainage and,
- Subject to scheme viability, developers will be required to demonstrate that new development incorporates sustainable construction techniques (In terms of energy targets this policy should be read alongside policy EN6 and the higher target will apply).

Policy T1 – Sustainable Transport: To deliver a sustainable, high quality, integrated transport system to encourage modal shift away from car travel to public transport, cycling and walking, to support the needs of residents and businesses and to prepare for carbon free modes of transport, the council will support proposals that:

- Improve choice by developing alternatives to the car;
- Facilitate modes of transport that reduce carbon emissions e.g by incorporating charging points for electric vehicles, subject to their appropriate design and location;
- Would reduce the negative impacts of road traffic, for example, congestion, air pollution and road accident casualties; and,
- Take account of the needs of road users according to a broad hierarchy consisting of, in order of priority:

    1. pedestrians and disabled people,
    2. cyclists, public transport,
    3. commercial access,
    4. general off peak traffic,
    5. general peak time traffic.

5.2.2 PFE - Addendum to Manchester Core Strategy

Following the adoption of the PfE document, the subsequent Core Strategy (CS) policies have been partially replaced by Places for Everyone (PfE) policies. Any part of the policy that is not replaced remains part of Manchester's Core Strategy.

CS Policy T1 Sustainable Transport: The following bullet point details what has been replaced:

- Take account of the needs of road users according to a broad hierarchy consisting of, in order of priority:

    - Pedestrians and disabled people
    - Cyclists, public transport,
    - Commercial access,
    - General off-peak traffic,
    - General peak time traffic.

    This policy was replaced by PfE Policy JP-CA1.

CS Policy EN4 Reducing CO_2 Emissions by Enabling Low and Zero Carbon Development: The following bullet point is what has been replaced:

- All development must follow the principle of the Energy Hierarchy.

  This policy was replaced by PfE Policy JP-S2.

CS Policy EN6 Target Framework for CO_2 Reductions from Low or Zero Carbon Energy Supplies: The following aspects of the policy have been replaced:

- The CO_2 emissions reduction targets and the target framework development locations

  This policy was replaced by PfE Policy JP-S2.

CS Policy EN8 Adaption to Climate Change: The following bullet point details what has been replaced:

- Minimisation of flood risk by appropriate siting, drainage, and treatment of surface areas to ensure rainwater permeability; and,
- The opportunity to provide linked and diverse green space to enhance natural habitats which will assist species adaptation.

  This policy was replaced by PfE Policies JP-S2, JP-S4 and JP-G8.

CS Policy EN14 Flood Risk: The following bullet point details what has been replaced:

- All new development should minimise surface water run-off, including through Sustainable Drainage Systems (SUDS) and the appropriate use of Green Infrastructure. Developers should have regard to the surface water run-off rates in the SFRA User Guide. In CDAs, evidence to justify the surface water run-off approach / rates will be required.

  This policy was replaced by PfE Policy JP-S4.

CS Policy EN15 Biodiversity and Geological Conservation: The following aspects of the policy have been replaced:

Development should wherever possible seek to maintain, enhance or restore existing geology.

This policy was replaced by PfE Policy JP-G8.

CS Policy EN17 Water Quality: The following bullet point details what has been replaced:

- Development should minimise surface water run-off from development and associated roads, and maximise the use of appropriate sustainable drainage systems, to minimise groundwater contamination, and to avoid pollutants reaching watercourses.

  Replaced by PfE Policy JP-S4

These elements of the above policies have therefore been removed from the previous Local Planning Policy section.

5.3 Regional Planning Policy

5.3.1 Places For Everyone

Places for Everyone (PfE) is the joint development plan of nine Greater Manchester local authorities (Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford, and Wigan) dealing with strategic planning issues including jobs, homes, transport, and the natural environment.

All nine authorities adopted the PfE Plan on 21st March 2024. Therefore, this document now forms part of the statutory development plan for each of the nine PfE authorities.

As a result, the following polices have been considered as part of the proposed development:

Policy JP-S1: Sustainable Development: To help tackle climate change, development should aim to maximise its economic, social and environmental benefits simultaneously, minimise its adverse impacts, utilise sustainable construction techniques and actively seek opportunities to secure net gains across each of the different objectives.

In bringing forward previously developed sites for development, particular attention will be paid to tackling land contamination and stability issues, ensuring that appropriate mitigation and remediation is implemented to enable sites to be brought back into use effectively.

Addressing Climate Change

Greater Manchester's Vision is to be at the forefront of action on climate change and to make its fair contribution to international commitments by becoming a carbon neutral city region by 2038.

To meet the carbon commitments, the following will be required:

- Be carbon neutral by 2038;
- Hold cumulative carbon dioxide emissions to within the council's carbon budget; and,
- Initiate a programme of mitigation to reduce emissions including by:
    - Significantly upscaling solar photovoltaic energy;
    - Reducing heat demand in homes;
    - Moving away from carbon intensive gas as the primary source of heat; and,
    - Increasing biofuel use.

- In supporting Greater Manchester's ambitions, climate change is a key theme running throughout the plan, rather than being reduced to a single policy, and it is only through this combination of actions that it can be properly addressed. In particular:
    - Methods to de-carbonise the city region through new and existing development, effective land management and through the provision of infrastructure and new technologies Policy JP-S2 'Carbon and Energy'; and,
    - The delivery of renewable and low carbon energy schemes Policy JP-S3 'Heat and Energy Networks'.

Carbon and Energy

- Meeting the 2038 carbon neutrality target will require a radical transformation across a range of sectors to drive carbon reduction. Within this, new development will have a critical role to play and all new homes and commercial/industrial buildings will need to achieve net zero carbon by 2028.

- It is expected that development in the plan area will apply a net zero carbon approach to operational emissions up until 2028, thereafter emissions in construction should be considered. Minimum carbon reduction targets will be set in line with the Future Homes Standard of 80% or until such a time this is superseded.

- From 2025, applicants will need to demonstrate carbon reductions have been maximised with an opportunity to offset any residual carbon to a carbon offset fund. The approach will be reviewed in line with future standards as they are introduced.

- By following the energy hierarchy, new development will need to achieve net zero carbon through the maximisation of on-site measures first. However, circumstances where a development has demonstrated that the hierarchy has been followed and there are no reasonable alternatives to meet the minimum carbon reductions, then payment to offset remaining emissions will also be required. Such payments should be expected to fund other carbon saving programmes within Greater Manchester to help meet the 5 Year Environment Plan targets.

Policy JP-S 2 – Carbon and Energy: The aim of delivering a carbon neutral Greater Manchester no later than 2038, with a dramatic reduction in greenhouse gas emissions, will be supported through a range of measures including:

- Promoting the use of life cycle cost and carbon assessment tools to ensure the long-term impacts from development can be captured;

- Taking a positive approach to renewable and low carbon energy schemes, particularly schemes that are led by, or meet the needs of local communities;
- An expectation that new development will, unless it can be demonstrated that it is not practicable or financially viable;

    - Be net zero carbon which applies:

        - From adoption – to regulated operational carbon emissions;

    - From 2025 development should also calculate and minimise carbon emissions from unregulated emissions alongside regulated emissions;

    - Development proposals should set out how this has been achieved in an energy statement in accordance with the energy hierarchy, which in order of importance seeks to:

        - Minimise energy demand;
        - Maximise energy efficiency;
        - Use renewable energy;
        - Use low carbon energy; and
        - Utilise other energy sources.

- From 2025 any residual carbon emissions that cannot be fully mitigated onsite should be offset, in agreement with the relevant local planning authority, through a financial contribution to a carbon offset fund;

- As an interim measure, development should be consistent with the 2021 Part L Building Regulations unless superseded by changes to building regulations and/or national or local planning policies.

    - Where practicable, prioritise connection to a renewable energy/heating/cooling network in the first instance or a low carbon energy/heating/cooling network that is adaptable to non-fossil fuels at a later date; and,

- For renewable energy generation priority should be given to PV installation where technically feasible, alternative technologies will be appropriate where the equivalent generation is evidenced;

- For non-residential developments, achieve at least BREEAM excellent standard (or equivalent) for the 'Ene 01 – reduction of energy use and carbon emissions' category rising to 'BREEAM outstanding' equivalent for ENE 01 from 2028;

- Include a detailed energy statement to demonstrate via site relevant evidence how the development has sought to maximize reductions in carbon emissions in line with relevant policy targets, including the minimisation of overheating risks and appropriate measures for post occupancy evaluation. Whole life cycle emissions should be considered where possible.

- Districts Local Plans may set out specific carbon emission reduction and energy demand targets within Local Plans.

Policy JP-STRAT14 - A Sustainable and Integrated Transport Network: New development will have a significant role in delivering a sustainable and integrated transport network in order to reduce car dependency and increase levels of walking, cycling and public transport.

Policy JP-S3 – Heat and Energy Networks: The provision of decentralised energy infrastructure is critical to the delivery of our objectives for low carbon growth, carbon reductions and an increase in local energy generation. The following measures will help to achieve this:

1. Delivery of renewable and low carbon energy schemes will be supported with particular emphasis on the use of decentralised energy networks in areas identified as "Heat and Energy Network Opportunity Areas". These have been identified where:

    a. Existing heat/energy networks are operational or have been commissioned;
    b. Sufficient density of existing heat demand occurs; and,
    c. Significant future development is proposed at the strategic development locations.

2. Within the identified "Heat and Energy Network Opportunity Areas", unless it can be demonstrated that there are more effective alternatives for minimising carbon emissions or such connection is not practicable or financially viable.

Policy JP-S4 - Flood Risk and the Water Environment: An integrated catchment-based approach will be taken to protect the quantity and quality of water bodies with reference to the North West River Basin Management Plan and managing flood risk, by:

- Working with natural processes and adopting a natural flood management approach to slow the speed of water drainage and intercept water pollutants;
- Locating and designing development so as to minimise the impacts of current and future flood risk, including retrofitting or relocating existing developments, infrastructure and places to increase resilience to flooding;
- Expecting developments to manage surface water runoff through sustainable drainage systems and as close to source as possible;
- Development should achieve greenfield run-off rates unless it is demonstrated to be impracticable; and,
- Ensuring that sustainable drainage systems:
    - Are designed to provide multifunctional benefits wherever possible, including for water quality, nature conservation and recreation;
    - Avoid adverse impacts on water quality and any possibility of discharging hazardous substances to ground;
    - Are delivered in a holistic and integrated manner, including on larger sites split into different phases; and
    - Are managed and maintained appropriately to ensure their proper functioning over the lifetime of the development.

- As a minimum, residential development should meet the mandatory water efficiency standard of 125 litres/person/day as set out in Building Regulations. District local plans may and should consider setting a tighter water efficiency standard of 110 litres/person/day where there is a clear local need with reference to national guidance on housing optional technical standards.

Policy JP-S6 - Resource Efficiency: The achievement of a circular economy and a zero-waste economy will play a key role in meeting Greater Manchester's ambition of becoming a leading green city region by 2038. The following measures will help achieve this:

- Development and implementation of the Zero Waste Strategy for Greater Manchester which promotes overall reduction in the level of waste produced and supports resource efficiency within the Plan area in order to gain the maximum value from the things we produce;
- Recognition of the role of existing infrastructure in managing our waste and protecting such facilities to ensure adequate waste management capacity is maintained; and
- Using sustainable design and construction techniques to reduce carbon emissions, adapt and future proof to the impact of climate change, reduce and recycle waste and minimise water use.

Policy JP-G2 – Green Infrastructure Network: A strategic approach will be taken to the protection, management and enhancement of Greater Manchester's Green Infrastructure in order to protect and enhance the ecosystem services which the Green Infrastructure Network provides, including flood management, climate change mitigation and adaptation.

Wherever practicable, opportunities to integrate new and existing green infrastructure into new development will be taken to protect, enhance and expand the green infrastructure network.

Policy JP-G6: Urban Green Space: To ensure there is an appropriate scale, type, quality and distribution of accessible urban green space that can support a high quality of life and other important green infrastructure functions:

- Existing urban green space will be protected and enhanced in balance with other considerations; and
- Developers and other stakeholders will be required to deliver new high quality urban green spaces.

Development should be designed to support the positive use of nearby green spaces, such as by offering a high-quality setting, providing natural surveillance, and facilitating easy access by walking and cycling.

Policy JP-G7 - Trees and Woodland: the aims and objectives of the Greater Manchester Tree and Woodland Strategy, aiming to significantly increase tree cover, protect and enhance woodland, and connect people to the trees and woodland around them.

This will be done through local planning and associated activities such as:

- Where development would result in the loss of existing trees, requiring replacement on the basis of two new trees for each tree lost, or other measures that would also result in a net enhancement in the character and quality of the treescape and biodiversity value in the local area, with a preference for on-site provision; and
- Protecting trees and woodland during the construction phase of development.

Policy JP-G8: A Net Enhancement of Biodiversity and Geodiversity: Through local planning and associated activities a net enhancement of biodiversity resources will be sought, including, where relevant, by:

- Increasing the quality, quantity, extent and diversity of habitats, particularly priority habitats identified in national or local biodiversity action plans and those that support priority species;
- Improving connections between habitats, to protect and enhance the provision of corridors, ecological networks (including Nature Recovery Networks) and steppingstones that enable the movement of species, especially as the climate changes;
- Enhancing the management of existing habitats, including through habitat restoration, avoiding habitat fragmentation and combating invasive species;
- Protecting sites designated for their nature conservation and/or geological importance, with the highest level of protection given to international and then national designations;
- Facilitating greater access to nature, particularly within urban areas;
- Supporting the development and implementation of the Great Manchester Wetlands Nature Recovery Network; and
- Safeguarding, restoring and sustainably managing our most valuable soil resources, tackling soil degradation/erosion and recovering soil fertility.

Development will be expected to:

- Follow the mitigation hierarchy of:
    - Avoiding significant harm to biodiversity, particularly where it is irreplaceable, through consideration of alternative sites with less harmful impacts, then
    - Adequately mitigating any harm to biodiversity, then
    - Adequately compensating for any remaining harm to biodiversity.

- Achieve a measurable net gain in biodiversity of no less than 10%; and,
- Development proposals should be informed by the findings and recommendations of the appropriate biodiversity/ecological assessment(s) in the PfE evidence base and/or any updated or appropriate biodiversity/ecological assessments submitted as part of the planning application process.

Policy JP-P1 - Sustainable Places: The aim is to become one of the most liveable city regions in the world, consisting of a series of beautiful, healthy and varied places, each having the following key attributes that all development, wherever appropriate, should be consistent with:

- Distinctive, with a clear identity that:
    - Conserves and enhances the natural environment, landscape features, historic environment and local history and culture;
    - Enables a clear understanding of how the place has developed; and
    - Respects and acknowledges the character and identity of the locality in terms of design, siting, size, scale and materials used.
- Resilient, capable of dealing with major environmental events;
- Adaptable, able to respond easily to varied and changing needs and technologies;
- Durable, being built to last and using robust materials that reflect local character, weather well and are easily maintained;
- Resource-efficient with:
    - A low carbon footprint;
    - Efficient use of land;
    - Minimised use of new materials; and,
    - High levels of recycling,
- Supported by critical infrastructure, such as energy, water and drainage and green spaces; and,
- Functional and convenient, enabling people and uses to act efficiently with minimal effort, and responding to needs relating to servicing, recycling facilities, refuse collection and storage.

5.4 Regulatory Framework

Building Regulations, Part L - Conservation of Fuel and Power sets the compliance standards for energy demand and carbon dioxide emissions from buildings. Guidance on how to meet the requirements of this regulation is provided within a number of approved documents. The relevant document is referenced below:

Approved Document Volume 1: Dwellings (2021 Edition) provides guidance on how to comply with Part L of Schedule 1 to the Building Regulations and the energy efficiency requirements for dwellings.

The minimum energy performance requirements shall be approved and expressed in accordance with the methodology for:

- New dwellings, in the form of target CO_2 emission rates;
- New dwellings, in the form of target fabric efficiency rates; and,

- New dwellings in the form of target primary energy rates.

5.5 Applicable Targets

Based upon a review of relevant planning policy requirements, legislative drivers, and client priorities, the following list provides a brief precis of the key criteria that should be targeted for this development:

Places for Everyone

- Policy JP-S1: Sustainable Development
- Policy JP-S2: Carbon & Energy
- Policy JP-STRAT14: A Sustainable and Integrated Transport Network
- Policy JP-S3: Heat and Energy Networks
- Policy JP-S4: Flood Risk and the Water Environment
- Policy JP-S6: Resource Efficiency
- Policy JP-G2: Green Infrastructure Network
- Policy JP-G6: Urban Green Space
- Policy JP-G7: Trees and Woodland
- Policy JP-G8: A Net Enhancement of Biodiversity and Geodiversity
- Policy JP-P1 Sustainable Places

Manchester Core Strategy

- Policy EN 4 - Reducing CO_2 Emissions by Enabling Low and Zero Carbon Development
- Policy EN 5 - Strategic Areas for low and zero carbon decentralised energy infrastructure
- Policy EN 6 - Target Framework for CO_2 Reductions from Low or Zero
- Policy EN 8 – Adaption to Climate Change
- Policy EN9 - Green Infrastructure
- Policy EN14 – Flood Risk
- Policy EN15 – Biodiversity and Geological Conservation
- Policy EN16 – Air Quality
- Policy EN19 – Waste
- Policy DM1 – Development Management
- Policy T1 - Sustainable Transport

Guide to Development in Manchester, Supplementary Planning Document

Manchester City Council Climate Emergency Declaration

Building Regulations, Part L

- Approved Document Volume 1: Dwellings (2021 edition)

6. ENERGY HIERARCHY

6.1 The Energy Hierarchy

The energy strategy for this development prioritises an enhanced 'fabric led' solution coupled with a fossil fuel free (that is, full electric) mechanical and electrical system provision. An enhanced building fabric specification throughout the scheme allied to efficient servicing and controls will achieve compliance with the new build carbon dioxide emission reduction and fabric energy efficiency targets stipulated by Building Regulation Part L, Trafford Local Plan, and Places for Everyone.

The Energy Hierarchy (see Figure 6.1) provides a framework to guide energy policy and decision making to achieve practical and cost-effective carbon emission reductions. The energy hierarchy is built upon the following guiding principles:

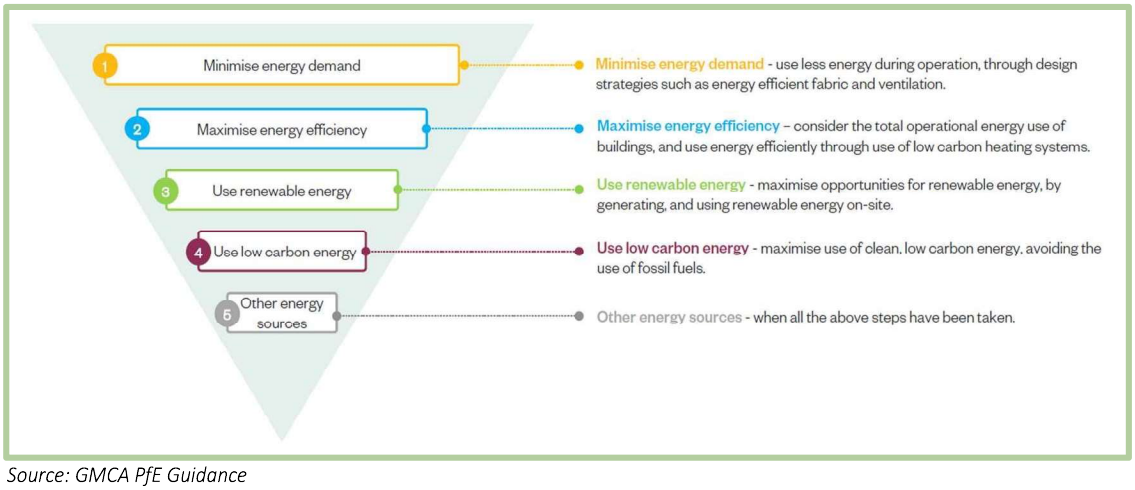
i. First Principle
   - Reduce the need for energy.

ii. Second Principle
   - Use energy more efficiently.

iii. Third Principle
   - Supply energy from renewable sources.

iv. Fourth Principle
   - Ensure that any continuing use of fossil fuels should use clean technologies and be efficient.

Figure 6.1 – The Energy Hierarchy



Source: GMCA PfE Guidance

The Energy Hierarchy has been used as a framework to guide the energy strategy to achieve practical and cost-effective carbon emission reductions. It is intended that the construction, design and specification proposed for this scheme will deliver dwellings that are inherently efficient and cost-effective during occupation.

The proposed energy strategy is presented in Section 7.

7. ENERGY STRATEGY

7.1 Building Fabric and Ventilation

The standard measurement of heat transfer through a given building material or construction type is the U-value (W/m^2K). The lower the U-value, the more slowly heat transfers and is lost out of a building. In buildings, heat loss generally occurs through the following main areas and elements of the construction:

- Ground floor;
- External walls;
- Roofs;
- Doors and windows;
- Thermal bridging; and,
- Uncontrolled ventilation.

This development will benefit from a material and design specification that is aligned with Building Regulation standards and will include numerous efficiency measures designed to reduce heat losses and minimise energy demand in accordance with the first principle of the energy hierarchy, including:

- ✓ High performance U - values;
- ✓ Reduced thermal bridge heat losses;
- ✓ Efficient form of construction; and,
- ✓ Low design air permeability target.

This 'fabric led' approach to minimising energy demand and associated carbon dioxide emissions through the performance of the thermal envelope is aligned with the first principle of the energy hierarchy, which states that reduction in energy demand should be achieved initially by energy efficiency.

7.1.1 - Building Form and Heat Loss Envelope

The form of the buildings proposed for the scheme is as follows:

- The 1 is an end terrace house type
- The 2 is a mid terrace house type
- The 3 is an end terrace house type

The calculated form factors for the house types have been calculated, as follows:

- Type 1 = 1.7
- Type 2 = 0.8
- Type 2 = 1.5

7.1.2 - Elevation Design and Window Proportions

The dwellings are of bespoke architectural design with a range of high specification design features and materials palette, allied to generous proportions and detailing.

7.1.3 Heated Spaces

Type 1, 2 and 3 have an external garage within the dwelling footprint, however, this is external to the thermal line. Please see Figure 2.3 and 2.5 for details of the garage arrangement. There are no unheated spaces within the building thermal envelope.

7.1.4 Building Fabric Specifications and Air Permeability

The proposed material specification that will be incorporated within the dwellings to limit heat loss and ensure efficient operation is presented in Table 5.1. The exact fabric specification will be refined further into the development cycle.

Table 7.1 – Proposed Fabric Specification

Item	Proposed Specification
Ground Floor	U=0.13 W/m^{2}K
External Wall	U=0.15 W/m^{2}K
Windows	U=1.20 W/m^{2}K
Doors	U=1.20 W/m^{2}K
Roof	U=0.15 W/m^{2}K
Air Permeability	5.00m^3/hm^2 (@50Pa.)
Cold Bridge	Recognised Construction Details

7.1.5 Ventilation System

The houses will benefit from continuously running extract ventilation fans. This achieves low power consumption, the low noise and the reduces life-cycle energy demand and costs.

7.1.6 Space Heating Demand

In order to demonstrate the environmental benefits associated with the energy strategy for the proposed new build dwellings, approved SAP 10 software has been used to generate representative energy demand models for the development. SAP software calculates the regulated energy demand and associated carbon dioxide emissions in accordance with the requirements of Building Regulations, Part L Approved Document Volume 1 (2021).

Representative SAP models have been calculated for house types 1 and 2. This sample provides a robust indication of the overall performance of the development proposals.

The space heating demand for the house types has been calculated, as follows:

- Type 1 = 11.34kWh/m^2/year
- Type 2 = 8.14kWh/m^2/year
- Type 3 = 15.2kWh/m^2/year

7.2 Maximise Energy Efficiency

7.2.1 Energy Use Intensity

Representative SAP models have been calculated for house types 1 and 2 This provides the regulated energy demand of the house types within the scheme.

In accordance with the published data from LETI and RIBA, the unregulated energy demand has been estimated as 22.5% of the regulated energy demand.

The energy use intensity (EUI) of a home or building is the total amount of energy (regulated and unregulated) it uses for all purposes in kWh/year, divided by the gross internal floor area (GIA) in m^2. The EUI has been calculated prior to the inclusion of the PV array.

Both regulated + unregulated energy demand have been assessed for the purposes of the Energy Use Intensity (EUI) calculation. The EUI for the house types has been calculated, as follows:

- Type 1 = 25.34kWh/m^2/year
- Type 2 = 22.21kWh/m^2/year
- Type 3 = 22.21kWh/m^2/year

7.2.2 Efforts to Reduce Energy Use of Equipment

In order to limit energy demand and carbon dioxide (CO2) emissions from the operation of the buildings, a number of design features will be integrated that will collectively contribute towards emission reductions for the scheme.

Detailed measures are presented in Chapter 5 of this report, but in essence, the energy strategy focuses on a holistic approach to improving the buildings' performance by applying a fabric-led strategy, allied to renewable and low carbon technology.

The reduction in energy demand to meet the carbon reduction targets will be achieved through the following design measures and low carbon technology:

- High performance thermal insulation;
- Low air permeability;
- Air Source Heat Pumps.
- Solar photovoltaic array;
- Sophisticated heating controls;
- Appliances and white goods specified will be highly energy efficient; and,
- Each dwelling will be specified with a smart meter to enable occupant to effectively monitor and manage their energy consumption.

The proposed specification will improve upon the requirements stipulated within Building Regulation Part L Approved Document Volume 1 (2021) compliance criteria.

7.3 Renewable Energy Generation

The operational efficiency of the development will be optimised via the use efficient mechanical and electrical (M&E) systems and low carbon and renewable energy generation.

The proposed building services that will be incorporated in the development to ensure efficient servicing is presented in Table 5.2. The exact M&E specification will be refined further into the development cycle at the technical design stage (RIBA Stage 4), post planning approval.

Table 7.2 – Proposed Mechanical and Electrical Specification

Item	Specification
Lighting	120lm/cW (100% LED)
Ventilation	Extract Fans
Space Heating	Air Source Heat Pump *Ideal Heating Logic Air 5kW*
Water Heating	Air Source Heat Pump *Ideal Heating Logic Air 5kW*
Heating Controls	Time and Temperature zone control
Renewables	Photovoltaic Arrays (3kWp)

7.3.1 Proposed Renewable Energy Generation System

Photovoltaic Array

Photovoltaic (PV) arrays have been selected as an appropriate renewable energy technology to contribute to the CO_2 emission reduction target for the development and to support the requirements stipulated within Places for Everyone. PV arrays are relatively straightforward to install, benefit from low maintenance costs and will reduce the operational cost of the building. The use of PV in general at this site would provide the following benefits:

- Reducing the buildings electrical energy grid load;
- Simple installation and commissioning;
- Low maintenance; and,
- Reliable, proven technology.

Table 7.3 – PV Capacity Requirement

House Type	PV Specification (kWp) Per House
Type 1	1kWp, , c.30°
Type 2	1kWp, c.30°
Type 3	2kWp, c.30°

Land Use –

- There are no land use issues associated with PV technology at this site;
- The development has sufficient roof area to accommodate the PV arrays; and,
- The PV arrays can be installed as part of the roof system in order to minimise the visual impact.

Local Planning Issues –

- There are no planning policy issues associated with this technology and this type of technology is favoured under the PfE requirements.

Noise Issues –

- PV is silent in operation.

Whole life cost and lifecycle impact –

- Current installed costs for PV are approximately £1,500 / kWp installed.
- Additional costs throughout the system's thirty-year lifecycle are limited to:
  - Cleaning of the arrays; and,
  - Replacement of the DC / AC inverter unit which typically have a lifespan of around ten years.

Air Source Heat Pumps

The proposed Air Source Heat Pump (ASHP) system that will be specified provides both space heating and hot water very efficiently. The basic components of an air source heat pump package comprise a hot water cylinder, heating coil, extractor fan and a heat pump linked to the heat distribution radiators and/or underfloor emitters.

This system provides the following benefits:

- Highly energy-efficient system, thus limiting electrical energy demand and associated carbon dioxide (CO_2) emissions;

- This technology benefits from a low 'carbon footprint' due to the inherent efficiency of the heat pump process. It is a well-established technology with an anticipated long lifespan - with proper care they can be operational for up to twenty years;

- Omission of fossil fuel connection from the proposed scheme will enable the development to track the decarbonisation of the UK electricity grid over time and reduce operational carbon emissions as a consequence; and,

- ASHPs primarily consume grid mix electricity which is, in part (albeit diminishing) sourced from a mix of fossil fuels / LZC and nuclear.

7.3.2 PV Footprint Area

The PV allocation is constrained by the complex roof design and room in roof configuration.

However, the dwelling specification includes high efficiency heat pumps and sophisticated controls. Consequently, the EUI for these dwellings is well below the PfE target value for houses of 35 kWh/m^2/year. The EUI for the house types has been calculated, as follows:

- Type 1 = 25.34kWh/m^2/year
- Type 2 = 22.21kWh/m^2/year
- Type 3 = 22.21kWh/m^2/year

7.3.3 Renewable Energy Balance

The proportion of total annual energy used (kWh/yr) (energy use intensity without dividing by area) for the development that will be balanced by the total annual generation of renewable energy on site. The renewable energy balance for the house types has been calculated[1], as follows:

- Type 1 = 17.5%
- Type 2 = 19.9%
- Type C = 17%

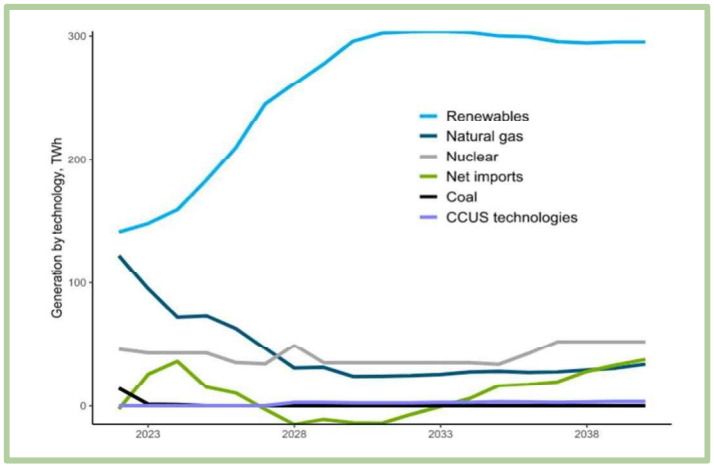
Renewable energy balance = Annual generation/total energy used (expressed as a percentage).

7.4 Low Carbon Heating

7.4.1 Fossil Fuel Free

The scheme will be fossil fuel free. As the UK electricity grid's CO_2 footprint continues to improve, so too would the carbon dioxide emissions associated with the operational phase of the proposed scheme, which benefits from highly efficient systems.

Figure 7.4 - Electricity Generation by Fuel Source, TWh



Source – BEIS, Energy and Emissions Projections (2022)

[1] *It has been assumed that 400W PV panels will be specified.*

UK grid mix electricity carbon emissions will decrease significantly by 2035, with the carbon intensity of electricity generation falling by 93% between 2020 and 2035. This is due to the progressive shift away from fossil fuels as demonstrated in Figure 7.4.

The energy strategy proposed for the scheme uses a combination of air source heat pumps and photovoltaics. The air source heat pumps are highly efficient systems that utilise grid electricity to provide space and water heating. The use of heat pumps will ensure that fossil fuels converted and distributed through the National Grid as electrical energy will be consumed cleanly and efficiently.

Therefore, this will further support the schemes move towards operational net zero carbon in accordance with the Places for Everyone requirements.

7.4.2 Proposed Heating and Hot Water System

The proposed specification includes an Air Source Heat Pump (Ideal Heating Logic Air 5kW providing both main space heating and hot water. This system operates with a COP of 329% efficiency.

7.4.3 Proposed Cooling System

There will be no active cooling measures within the properties. Purge ventilation will be provided by openable windows.

7.5 Overheating Risk

7.5.1 Natural Ventilation

The dwellings will be predominantly naturally ventilated, via extract fans.

7.5.2 Overheating Risk Assessment

The developer commits to completing dynamic simulation modelling (CIBSE TM59) analysis to assess and determine an appropriate overheating (building regulation, Part O) mitigation strategy (if required). This will be done post planning approval.

During the planning process the layouts/elevations could change as comments and feedback are received therefore it is preferable to complete the calculation once layouts and elevations are fixed.

It is recognised that the solution to mitigating overheating may require glazing solar control measures and/or increased ventilation rates. Active cooling is not proposed as part of the overheating strategy.

7.6 Materials

7. 6.1 Efforts Made to Minimise Embodied Carbon

The proposals will contribute towards making more efficient use of non-renewable materials resources, and to reducing the lifecycle impact of materials used in construction. This is demonstrated by:

- A key consideration in materials selection will their environmental performance, alongside commercials and aesthetics. Indirect carbon emissions will therefore be taken into account,

including those involved in the extraction/cultivation, manufacture and handling processes; and subsequent, in-life emissions resulting from the use of those materials in development;

- Materials with a low environmental impact throughout their life cycle will be prioritised within the new buildings. Plus, materials with associated Environmental Performance Declarations (EPD's) will be favoured;

- Responsibly sourced materials from suppliers operating an Environmental Management System and procuring timber verified by either the Forest Stewardship Council (FSC) or Programme for the Endorsement of Forest Certification standard (PEFC) will be prioritised;

- Material selection will be carefully considered to avoid the use of toxic materials, such as Volatile Organic Compounds (VOCs) and contribute towards creating a healthy indoor environment; and,

- Local sourcing of construction materials where feasible and viable will minimise the impact of carbon dioxide emissions associated with the transportation of materials.

Meadway Developments Ltd undertake to ensure the following measures are implemented at this site:

- Recycle materials on site from demolition removal of hard standings;

- Use crushed recycled materials as standard for areas such as bases for hard standings, beneath roads etc.;

- All labour is sourced from within the northwest, therefore reducing journeys;

- Wherever feasible all materials are sourced locally;

- Materials and plant / fixtures and fittings are selected for longevity; and,

- Site Waste is segregated at source to facilitate recycling.

Appendix B – Part O, Overheating

ELEMENT SUSTAINABILITY

KNOTT MILL

OVERHEATING REPORT

OCTOBER 2025

REF: 2025.170



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1. EXECUTIVE SUMMARY

The following report summarises the overheating analysis which has been undertaken for thirty-four house types, in accordance with Building Regulations Approved Document O: Overheating and CIBSE TM59: Design Methodology for the Assessment of Overheating Risk in Homes. The dynamic thermal modelling method for demonstrating compliance with requirement O1 has been followed as an alternative to the simplified methodology stipulated within Approved Document O.

Design Builder v7.2.0.032 Dynamic Simulation Modelling (DSM) Software has been used to assess the overheating risk, using the internationally approved Energy Plus Simulation Engine and the following guidance has been followed:

- CIBSE's TM59 methodology for predicting overheating risk;
- The limits on the use of CIBSE's TM59 methodology; and,
- The acceptable strategies for reducing overheating risk.

The properties that have been assessed are as follows:

- Type 1
- Type 2
- Type 3

This report demonstrates that the residential buildings assessed comply with Building Regulations, Part O and CIBSE's TM59 assessment of overheating, however, the dwellings require the following measures to do so:

- Further mechanical ventilation within bedrooms specified in Section 7 - Results

Table 7.1 – Model of proposed site



2. INTRODUCTION

Element Sustainability have been commissioned by Jones Homes Northwest Limited to undertake a domestic overheating assessment for forty house types. This report has assessed the dwellings against Approved Document O - Requirement O1: Overheating mitigation (2021) compliance criteria.

This report summarises the overheating analysis which has been undertaken for the proposed development and is based on the suggested reporting requirements contained within:

- Building Regulation Approved Document O; and,
- CIBSE Technical Memorandum 59: Design methodology for the assessment of overheating in homes: 2017 (TM59).

Compliance with this guidance is widely recognised as the benchmark for assessing if overheating is likely to occur within buildings.

The study is based on dynamic simulation modelling (DSM), which estimates the indoor climate of the buildings over a period, based on a range of factors including:

- Weather and climate predictions;
- Solar heat gain through building façade;
- Heat loss though the building thermal envelope; and,
- Building Heating, Ventilation and Air-conditioning (HVAC).

All results and strategies are directly affected by the inputs listed in this document; any deviation from these is bound to generate different results, which may lead to the proposed designs not meeting the required criteria.

It is important to note that, as with any modelling exercise, necessary assumptions and approximations need to be made. As far as possible, details of all assumptions made, and approximations used, are supplied as part of this report.

All results are based on the DSM produced, which is based on climatic conditions and patterns of use bound not to be identical to the real-life situation. Therefore, these results should be read as those following the overheating mitigation risk calculation methodology, but not as guaranteed real-life observations.

3. PART O AND CIBSE TM59 REQUIREMENTS

3.1 Building Regulations: Part O

Building Regulations Part O applies to new residential dwellings and covers the overheating mitigation requirements of the building regulations as set out in Part O of Schedule 1 (O1).

The aim of requirement O1 is to protect the health and welfare of occupants of new residential buildings, by reducing the occurrence of high indoor temperatures. In the Secretary of State's view, requirement O1 is met by designing and constructing the building to achieve the following:

- Limiting unwanted solar gains in summer; and,
- Providing an adequate means of removing excess heat from the indoor environment.

In meeting the requirement of O1, the following needs to be taken in to account:

- The safety of any occupant, and their reasonable enjoyment of the residence; and,
- Mechanical cooling may only be used where insufficient heat is capable of being removed from the indoor environment without it.

The building should be constructed to meet requirement O1 using passive means as far as reasonably practicable. All practicable passive means of limiting unwanted solar gains and removing excess heat shall be used first before adopting mechanical cooling. Any mechanical cooling (air-conditioning) is expected to be used only where requirement O1 cannot be met using openings.

This section details the dynamic thermal modelling method for demonstrating compliance with requirement O1.

To demonstrate compliance using the dynamic thermal modelling method, all of the following guidance has been followed:

a) CIBSE's TM59 methodology for predicting overheating risk;
b) The limits on the use of CIBSE's TM59 methodology set out; and,
c) The acceptable strategies for reducing overheating risk.

3.2 CIBSE TM59

The occupied residential spaces should have their performance measured against the requirements of CIBSE Technical Memorandum 59 'Design methodology for the assessment of overheating risk in homes', published in 2017.

The guidance requires that the following criteria is met:

For homes that are predominantly *naturally* ventilated:

As per Section 4.2 of CIBSE TM59, compliance is based on passing *both* of the following two criteria:

- Criteria A - For living rooms, kitchens and bedrooms: the number of hours during which ΔT (difference in temperature) is greater than or equal to one degree (K) during the period May to September inclusive shall not be more than 3% of occupied hours. (*CIBSE TM52 Criterion 1: Hours of exceedance*).

- Criteria B - For bedrooms only: to guarantee comfort during the sleeping hours the operative temperature in the bedroom from 10 pm to 7 am shall not exceed 26°C for more than 1% of annual hours. (Note: 1% of the annual hours between 22:00 and 07:00 for bedrooms is 32 hours, so 33 or more hours above 26°C will be recorded as a fail).

For homes predominantly *mechanically* ventilated:

- For homes with restricted window openings, the CIBSE fixed temperature test must be followed, i.e. all occupied rooms should not exceed an operative temperature of 26 ˚C for more than 3% of the annual occupied annual hours (CIBSE Guide A (2015a)).

This assessment will determine the thermal comfort performance of occupied areas against the performance requirements of CIBSE TM59 for predominantly naturally ventilated homes.

3.2.1 CIBSE TM59 Limits

CIBSE's TM59 method requires the modeller to make choices. The dynamic thermal modelling method in this section applies limits to these choices, which are detailed below.

These limits should be applied when following the guidance in CIBSE's TM59 as stated within Approved Document O.

- When a room is occupied during the day (8am to 11pm), openings should be modelled to do all of the following:
    - Start to open when the internal temperature exceeds 22°C.
    - Be fully open when the internal temperature exceeds 26°C.
    - Start to close when the internal temperature falls below 26°C.
    - Be fully closed when the internal temperature falls below 22°C.

- At night (11pm to 8am), openings should be modelled as fully open if both of the following apply.
    - The opening is on the first floor or above and not easily accessible; and,
    - The internal temperature exceeds 23°C at 11pm.

- When a ground floor or easily accessible room is unoccupied, both of the following apply:
    - In the day, windows, patio doors and balcony doors should be modelled as open, if this can be done securely.
    - At night, windows, patio doors and balcony doors should be modelled as closed.

- An entrance door should be included, which should be shut all the time.

4. PART O CHECKLIST

This compliance checklist is divided into three parts, which are as follows.

1. Part 1 contains the building details and declarations.
2. Part 2a functions as a design checklist for the simplified approach detailed in Section 1[1].
3. Part 2b functions as a design checklist for the dynamic thermal modelling approach.
4. Part 3 is for verifying the completion details of the as-built residential building.

4.1 Part 1 – Building Details and Declarations

Building and Site Details	
Site Name	Knott Mill
Town	Manchester
Building Use/ Type	Residential Dwellings

4.2 Part 2b – Dynamic Thermal Modelling Method Parameters

Modelling Details		
Dynamic software name and version	Design Builder v7.2.0.032	
Weather file location used, including any additional, more extreme weather files	CIBSE DSY1 2020's, high emissions 50th percentile for Manchester.	
Number of sample units modelled, including an explanation of why the size/selection has been chosen	Refer to Section 4.2	
Modelled Occupancy		
Has the project passed the assessment described in CIBSE's TM59, considering the limits detailed in paragraphs 2.5 and 2.6?	Yes	No
	✓	
Details of the occupancy profiles used	Refer to Section 6.4	
Details of the equipment profiles used	Refer to Section 6.4	
Details of the opening profiles used	Refer to Section 6.6	
Modelled Overheating Mitigation Strategy		
Infiltration and mechanical flow rates	dMEV + natural ventilation through opening windows + further mechanical ventilation in bedrooms, specified in the results section below + window g-value set to 0.66 for ground floor windows and 0.71 for first or second floor windows.	
Window g-value	Ground Floor windows g=0.66 First Floor windows g=0.71	
Mechanical cooling	N/A	
Modelling Results		
Has the project passed the assessment described in CIBSE's TM59, taking into account the limits detailed in paragraphs 2.5 and 2.6?	Yes	No
	✓	

[1] Part 2a is not applicable to this assessment.

What is the overall overheating strategy (i.e. what design features are key to the project passing)?	dMEV + natural ventilation through opening windows + further mechanical ventilation in bedrooms, specified in section 7 + window g-value set to 0.66 for ground floor windows and 0.71 for first or second floor windows.

4.3 Internal Conditions

Defined by dynamic simulation model as per TM59:2017, Section 6, Table 2 demonstrated in table 6.1 below:

Table 6.1 - Occupancy and Equipment Gain Descriptions

Table 2 Occupancy and equipment gain descriptions

Unit/ room type	Occupancy	Equipment load
Studio	2 people at 70% gains from 11 pm to 8 am 2 people at 100% gains from 8 am to 11 pm	Peak load of 450 W from 6 pm to 8 pm*. 200 W from 8 pm to 10 pm 110 W from 9 am to 6 pm and 10 pm to 12 pm Base load of 85 W for the rest of the day
1-bedroom apartment: living room/kitchen	1 person from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 450 W from 6 pm to 8 pm 200 W from 8 pm to 10 pm 110 W from 9 am to 6 pm and from 10 pm to 12 pm Base load of 85 W for the rest of the day
1-bedroom apartment: living room	1 person at 75% gains from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 150 W from 6 pm to 10 pm 60 W from 9 am to 6 pm and from 10 pm to 12 pm Base load of 35 W for the rest of the day
1-bedroom apartment: kitchen	1 person at 25% gains from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 300 W from 6 pm to 8 pm Base load of 50 W for the rest of the day
2-bedroom apartment: living room/kitchen	2 people from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 450 W from 6 pm to 8 pm 200 W from 8 pm to 10 pm 110 W from 9 am to 6 pm and from 10 pm to 12 pm Base load of 85 W for the rest of the day
2-bedroom apartment: living room	2 people at 75% gains from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 150 W from 6 pm to 10 pm 60 W from 9 am to 6 pm and from 10 pm to 12 pm Base load of 35 W for the rest of the day
2-bedroom apartment: kitchen	2 people at 25% gains from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 300 W from 6 pm to 8 pm Base load of 50 W for the rest of the day
3-bedroom apartment: living room/kitchen	3 people from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 450 W from 6 pm to 8 pm 200W from 8 pm to 10 pm 110 W from 9 am to 6 pm and from 10 pm to 12 pm Base load of 85 W for the rest of the day
3-bedroom apartment: living room	3 people at 75% gains from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 150 W from 6 pm to 10 pm 60 W from 9 am to 6 pm and from 10 pm to 12 pm Base load of 35 W for the rest of the day
3-bedroom apartment: kitchen	3 people at 25% gains from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 300 W from 6 pm to 8 pm base load of 50 W for the rest of the day
Double bedroom	2 people at 70% gains from 11 pm to 8 am 2 people at full gains from 8 am to 9 am and from 10 pm to 11 pm 1 person at full gains in the bedroom from 9 am to 10 pm	Peak load of 80 W from 8 am to 11 pm Base load of 10 W during the sleeping hours
Single bedroom (too small to accommodate double bed)	1 person at 70% gains from 11 pm to 8 am 1 person at full gains from 8 am to 11 pm	Peak load of 80 W from 8 am to 11 pm Base load of 10 W during sleeping hours
Communal corridors	Assumed to be zero	Pipework heat loss only; see section 3.1 above

* All times in GMT

4.4 Ventilation Strategy

4.4.1 Natural Ventilation

Natural ventilation is provided by openable windows as per the proposed house type drawings.

The ground floor windows have been assessed based on the following opening schedule:

- Open in the day; and,
- Closed at night.

Whereas the remaining windows have been modelled as:

- Open in the day and throughout the night, unless a security issue has been identified in line with the requirements stipulated within Approved Document, Part O (2021).

TM59 suggests that internal bedroom doors should be modelled as closed when the occupants are sleeping which has been incorporated into the models.

The windows are also simulated to be opened when a room is occupied and the operative temperature in the room is above 22°C. There are no acoustic restrictions for the design, however, as highlighted above in Section 5.1 windows deemed easily accessible cannot remain open at night and must be modelled as closed.

Air infiltration through other openings, such as trickle vents, is simulated and included in the natural ventilation rate.

4.4.2 Mechanical Ventilation

Mechanical ventilation is provided within the kitchens, bathrooms, and WCs via decentralised mechanical extract ventilation (dMEV) units. Additionally, to mitigate the risk of overheating, some bedrooms have been modelled with further mechanical ventilation.

4.4.3 Overheating Mitigation Measures

In order to comply with Approved Document O: Overheating, the following measures will need to be addressed as part of the proposed scheme:

- Limiting unwanted solar gains in summer.
- Removing excess heat from the indoor environment
- Safety of any occupant, and their reasonable enjoyment of the residence; and
- Mechanical cooling may only be used where insufficient heat is capable of being removed from the indoor environment without it.

<u>Mitigation Measures</u>

The following measures have been applied to the building designs with no mitigation methods:

- Further mechanical ventilation within bedrooms specified in the results section below

5. RESULTS

This section details the results obtained from the Part O assessment of overheating risk in the occupied areas of the dwellings. Tables 7.1 to 7.10 show the results:

5.1 Results

Table 7.1 – Results: Type 1

Zone	Criterion A (%)	Criterion B (hr)	Pass/Fail
01.1.Bedroom2	0.33	31.83	Pass
01.1.Bedroom3	0.17	6.17	Pass
02.1.Bedroom1	0.30	11.17	Pass
03.1.Living.Kitchen.Dining	2.08	0.00	Pass

Table 7.2 – Results: Type 2

Zone	Criterion A (%)	Criterion B (hr)	Pass/Fail
01.2.Bedroom2	0.35	6.50	Pass
01.2.Bedroom3	0.34	5.83	Pass
01.2.Bedroom4	0.00	1.17	Pass
02.2.Bedroom1	0.56	10.50	Pass
02.2.Living	0.00	0.00	Pass
03.2.Living.Dining.Kitchen	2.29	0.00	Pass

Table 7.3 – Results: Type 3

Zone	Criterion A (%)	Criterion B (hr)	Pass/Fail
01.5.Bedroom2	0.63	11.00	Pass
01.5.Bedroom3	0.95	7.83	Pass
01.5.Study	1.57	0.00	Pass
02.5.Bedroom1	1.06	23.33	Pass
03.5.Living.Dining.Kitchen	2.32	0.00	Pass

6. CONCLUSION

An assessment has been undertaken of the domestic overheating performance for thirty-four plots modelled in their respective orientations using the Manchester weather file to support site wide compliance.

The assessment methodology demonstrates the performance of occupied areas against the requirements of Building Regulations Approved Document O (2021) and CIBSE TM59 for predominantly naturally ventilated homes.

This study concludes that all spaces have been able to demonstrate compliance against the Part O Dynamic Thermal Modelling analysis for homes using the following mitigation measures:

- Further mechanical ventilation within bedrooms specified in the results (Section 7) above

The design team will ensure that the results of this overheating analysis continue to be incorporated into the buildings specification discussions as the design evolves.